

June 26, 1866.

Dr. J. Hamilton, F.L.S., in the Chair.

The Secretary called the attention of the Meeting to a fine specimen of the Californian Vulture (*Cathartes californianus*, Shaw), recently added to the Society's living collection. This scarce bird had been presented to the Society by Dr. Colbert A. Canfield, of Monterey, California, through the intervention of Prof. Baird of the Smithsonian Institution, Washington, and kindly assisted in its passage across the Isthmus of Panama by Capt. J. M. Dow.

*Cathartes californianus.*

Mr. Louis Fraser exhibited a pair of Horns of a Deer, which had been killed near the village of Bosa-Bosa, near Manilla, in the island of Luzon, one of the Philippine group, and stated that he considered them to belong to the *Cervus mariannus* of Desmarest, and that they were the first fragments of this species ever exhibited before the Society. The species had not been obtained by the late Hugh Cuming, Esq., during his sojourn in that country.



*Cervus mariannus.*

Quoy and Gaimard, the first discoverers of this animal, had stated that they found upwards of a thousand specimens of this Deer in the Island of Guam, one of the Mariannes Islands, into which place it had been imported from the Philippines, and was doing well.

Mr. Fraser could not help believing this animal to be very distinct from the *Cervus philippinus* of H. Smith, which is described as having the horns raised upon long peduncles like the Muntjac's, whilst the present species most certainly belongs to the *Rusa* group.

The references to the species were stated to be as follows :—

*Cervus mariannus*, Desm. Mamm. p. 436, 1820.

*Cerf des Iles Mariannes*, Quoy et Gaim. Voy. de l'Uranie, Zoologie, p. 33, 1824.

*Cervus mariannus* (Desm.), Cuv. Oss. Foss. iv. p. 45, pl. 5. figs. 30, 37, 38, 46, 1825 ; H. Smith, Griff. Anim. King. iv. p. 115, 1827 ;

Fisch. Syn. Mamm. p. 453, 1829; Desmoul. Dict. Class. iii. p. 384. 23; Sundevall, Pecora, p. 57; Gray, Proc. Zool. Soc. 1850, p. 232.

The following papers were read :—

1. On the Habitat of the Derbyan Crested Screamer (*Chauna derbiana*, G. R. Gray). By THOMAS J. MOORE, C.M.Z.S., Keeper of the Derby Museum, Liverpool.

The type specimen and one other example of this rare bird, both in this Museum, are, I believe, the only hitherto distinctly recognized specimens of *Chauna derbiana*. This species, which was named and figured in January 1845 by Mr. G. R. Gray, in his 'Genera of Birds,' from a specimen brought from Belize to England by Mr. J. Bates (not Mr. H. W. Bates of the Amazons), who had it some months alive, appears to have been unhesitatingly and not unnaturally looked upon as a native of Central America. And though Mr. Gray, in pursuance of his general plan, gives no locality to the species in his text, he is clearly speaking of this when in his notes on the *genus* he gives *Central* as well as South America as habitats.

Dr. Sclater, in February 1864, being specially desirous of ascertaining its native country, wrote to me for any information I could give him on this point, and my reply will be found in his paper on the genus in the Society's 'Proceedings' for 1864, p. 75. That reply endorsed the received opinion, notwithstanding that our second bird claimed to be from Bogota. I could, indeed, hardly have come to any other conclusion. I had no other evidence to bring forward in support of Bogota, while the type specimen, a stuffed bird, bore a label by the stuffer inscribed "J. Bates, Peten, Sept. 1843," and, far more important still, the following label in Bates's own handwriting:—"Kept this alive by cramming it with food upwards of four months. Died while I was at Peten."

Now Bates was sent by the late Lord Derby to Guatemala and Honduras to collect mammals and birds both living and dead. His first duty was, if possible, to procure living examples of *Meleagris ocellata*. He returned, after an absence of fifteen months, with a large collection living and dead, including one living female, and several skins of both sexes, of the *Meleagris*, and, greater prizes still, a skin of each of two previously unknown remarkable birds, the *Oreophasis derbiana* and this *Chauna*. The locality of "Peten" seems to have been at once accepted by Lord Derby for the latter, and it was so recorded in the 'Knowsley Catalogue.' I had seen no reason to doubt the localities ascribed to other specimens of Bates's collecting; and of the still more remarkable *Oreophasis*, inhabiting an exceedingly limited district, additional examples had been obtained in the same country by subsequent collectors.

And yet, in spite of all this strong circumstantial evidence in favour of the conclusion that the *Chauna derbiana* was a native, if



not of Peten, at least of Guatemala or Honduras, the conclusion is utterly erroneous. And the mystery is thus solved. Mr. Bates, some time since, passed through Liverpool on his way from Chicago, and he fortunately visited this museum. In reply to my eager inquiries on the subject he told me, to my great surprise, that the bird was *not* a native of that country at all, but that "*it was purchased alive by him at Belize, from a ship which had arrived from a port further south ! though he thinks not very far south.*"

The only reason for considering the bird a native of Central America at all being thus exploded, there remains for more respectful consideration the locality given with our second specimen, that purchased from Mr. Leadbeater. This locality is "Bogota;" and, remarkably enough, the label bears the same date as that of Bates's specimens, both having been received in September 1843, though there is no entry whatever of this second bird in the 'Catalogue' spoken of above. But neither Bogota, situate at the base of two lofty mountains and nearly 9000 feet above the sea-level, nor any district immediately subjacent to it, is likely to afford very suitable haunts for a bird of this kind; but that its true home will be found to be in low and swampy parts of New Granada may, I think, ultimately be proved to be true. This view receives countenance at least from the occurrence of the most closely allied, more recently discovered, *Chauna nigricollis* of Dr. Sclater, of which the four known specimens have all been received from the neighbourhood of Cartagena, New Granada. The description and figure of this species, as given in the 'Proc. Zool. Soc.' 1864, p. 75, pl. XI., are so applicable to *C. derbiana* that actual comparison is, I think, desirable satisfactorily to determine their identity or distinction,—the contrast between the black of the neck and the paler colour of the body of *C. nigricollis* being distinct enough in the specimens of *C. derbiana*, though not sufficiently brought out in the figure in Gray's 'Genera,' owing doubtless to the allowance made for the dingy state of Bates's specimen consequent on its long captivity and rough treatment.

2. Note on *Chauna nigricollis*. By P. L. SCLATER, M.A.,  
Ph.D., F.R.S., Secretary to the Society.

Along with the communication which has just been read to the Meeting, Mr. Moore was kind enough to send up to the care of Mr. G. R. Gray the two original specimens of *Chauna derbiana* belonging to the Derby Museum. On comparing these with the typical example of my *C. nigricollis* in the British Museum, I at once came to the conclusion that the two species were identical; and I may state that Mr. Gray, who most obligingly requested my assistance in making the comparison, was of the same opinion.

As some apology for having made the error of constituting the *Chauna nigricollis* as distinct, I may urge, first, that, as Mr. Moore



has already shown, the locality heretofore assigned to it is quite incorrect; and secondly, that in comparing my bird with *Chauna derbiana* I had only the figure (Gray & Mitchell, Genera of Birds, pl. 161) to go by, no description ever having been published of this species, and that the figure is much too darkly coloured, particularly on the lower parts.

It follows, therefore, that there are only two known species of this curious form:—

1. *C. chavaria* of South-eastern Brazil and Paraguay.
2. *C. derbiana* (= *C. nigricollis*) of the northern littoral of New Granada.

### 3. Descriptions of Three Species of Snakes of the Genus *Hoplocephalus*. By GERARD KREFFT, Curator and Secretary of the Australian Museum, Sydney, N.S.W., C.M.Z.S.

#### 1. *HOPLOCEPHALUS ATER*, sp. nov.

Scales in 17 rows. Anal entire. Subcaudals 47. Ventrals 162.

*Coloration*.—Black; chin-shields whitish on outer margin; beneath bluish black, clouded with a somewhat lighter tint on the posterior part.

Head scarcely distinct from trunk, high, quadrangular, obtuse in front; anterior frontals as large again as the posterior ones, vertical five-sided, just as long as broad; occipitals very large, widely forked; six upper labials, fifth largest, leaving but one narrow temporal shield above it; there are two more temporals behind this one, of which the upper one is the largest. The occipitals do not come into contact with more than three scales on each side; whilst one scale is wedged in between the fork, making seven scales in all. There are seven lower labials, one nasal, one anterior, and two postoculars; the pupil is rounded.

*Hab.* Flinder's Range, South Australia. Discovered by Mr. George Masters, who found but one specimen.

#### 2. *HOPLOCEPHALUS MASTERSII*, sp. nov.

Scales in 15 rows. Ventrals 136. Subcaudals 40, or more.

Head triangular, distinct from trunk, and pointed in front; vertical three times as long as broad; all the scales of the head much elongate; six upper and seven lower labials, one anterior, two postoculars, the first (anterior one) grooved.

*Coloration*.—Dark olive-green above and below, with the exception of a yellowish-white elongate patch in the middle of each ventral scale; all the scales very finely striated or keeled (which is not observable to the naked eye), and more or less finely black-dotted. Head darker than the body, a whitish band crossing the nape, a

second white band spotted with black beneath the eye from the rostral to the last upper labial.

In young specimens the ventral scales in the middle of body are red.

*Hab.* Flinder's Range. Collected by Mr. George Masters, who found seven specimens.

### 3. *HOPLOCEPHALUS GOULDII*, Gray (var.).

Scales in 15 rows. Anal entire. Ventrals 148. Subcaudals 34; in others 26, 27, 33, 31, and 29.

Head depressed, scarcely distinct from trunk; vertical five-sided, with acute angle behind; occipitals large, not much forked; anterior frontals triangular; posterior frontals quadrangular, somewhat larger than the former. Seven upper and seven lower labial scales, smooth, rather short, six-sided, lighter on the outer margin.

*Coloration.*—Greyish brown above, yellowish white below; the marks upon the head vary in different individuals; rostral, nasal, and anterior part of first pair of frontals marked with black; remaining portion of anterior frontals and whole of posterior ones reddish, after which another black patch covers the vertical superciliaries and part of the occipitals, a faint star marking all the scales around the inner margin of the eye; pupil subelliptical, erect; a third black spot covers the nape of the neck, about four scales wide, but not reaching to the sides. In some of the specimens before me the second black patch is continuous, leaving only the tips of the occipitals and the scale between them reddish.

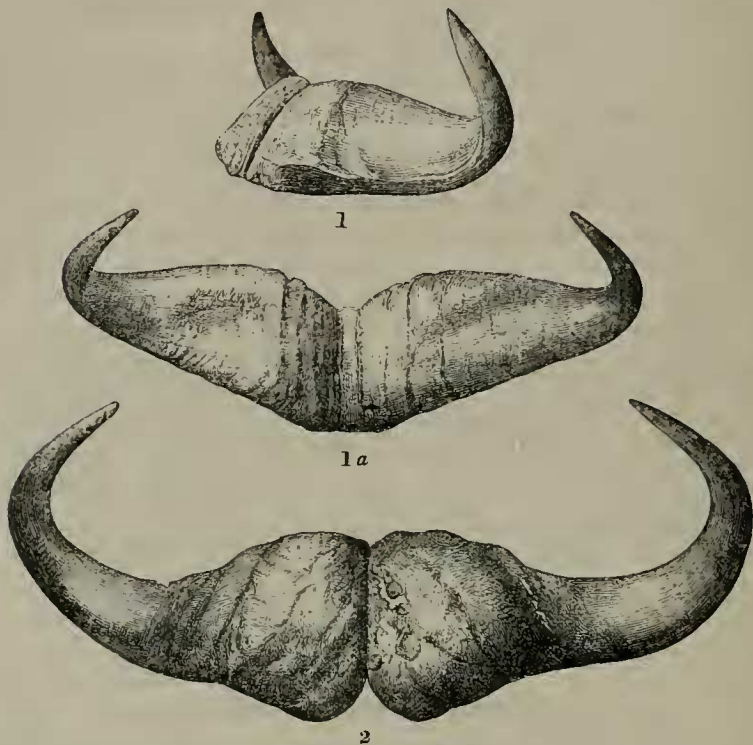
*Hab.* Port Lincoln. Collected by Mr. George Masters.

### 4. A Note on African Buffalos.

By EDWARD BLYTH, C.M.Z.S.

More than a quarter of a century ago, when the Society maintained its Museum in Leicester Square, it was in possession of the skin of a Buffalo from the Galla country south of Abyssinia, received from Dr. Rüppell, by whom the race was considered to be identical with the well-known *Bubalus caffer* of South Africa. To me it presented certain differences which seemed indicative of its being a distinguishable race, characterized by much smaller size and horns of greatly inferior development when fully grown; moreover the latter did not bend decidedly downwards and then curve upwards as in the Cape animal, but were nearly on a level throughout, approximating to those of the *B. planiceros*, nobis, figured in the Society's 'Proceedings' for 1863, p. 158. Although still possessing a carefully drawn figure of the frontlet of the Galla specimen, formerly in the Society's collection, I intentionally refrained from noticing it when exhibiting the frontlet of *B. planiceros*, figured in the Society's 'Proceedings' for 1863, in the hope and expectation, which has now

been realized, of confirming the impression founded upon that single specimen; and I have now the pleasure of exhibiting two frontlets of mature growth, which were procured in Equatorial Africa by Mr. Petherick, and together with them two splendid heads of the southern *B. caffer* for comparison. Of the latter I have seen a very considerable number of skulls and frontlets, of all ages and stages of development, but never one that resembled the specimens from Equatorial Africa now exhibited; and the living animal at present in the

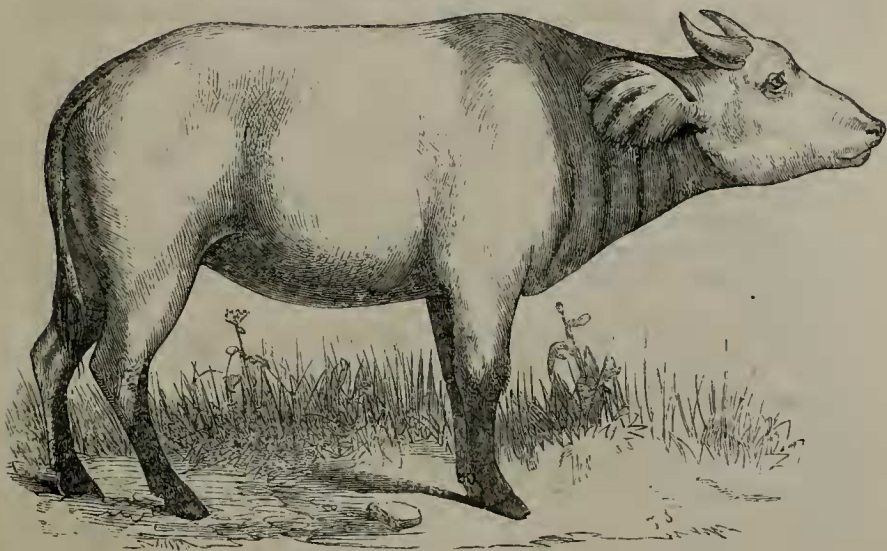


Society's Menagerie is distinctly of the southern race as distinguishable from the other, as shown by the much greater elongation as well as thickness of that terminal portion of its horns which constitutes their upward curvature. The accompanying figures (1, 1a) of the two frontlets from Equatorial Africa and that (fig. 2) of the superb Cape specimen, one of the two exhibited before the Meeting, were photographed at the same focus, and therefore present exactly the relative size which the specimens bear towards each other; and the difference is so very considerable, not only as compared with the noble example of *B. caffer* represented, but with all that I have ever seen of the latter from South Africa, that I think the equatorial race should at least be recognized as *B. caffer*, var. *æquinotialis*, if not more decidedly as *Bubalus æquinotialis*. By Mr. S. W. Baker, who possesses two fine skulls of the Equatorial Buffalo, I am informed that the species is not common on the banks of the White Nile, but



considerably less so than the true *B. caffer* with which it associates. He considers the two to be decidedly distinct; and one of his two specimens is from the Galla country, the other from the White Nile.

In my collection of drawings I have found a characteristic representation, taken from the living animal, of the cow of *Bubalus brachyceros*, Gray, the great-eared Buffalo of Western Middle Africa.



*Bubalus brachyceros.*

This animal was from the Foulah country, north of Sierra Leone, where the species is abundant. It was met with by Capt. Clapperton in the vicinity of Lake Tchad, and more recently by M. du Chaillu. The colouring of the species much resembles that of the Red River-Hog (*Potamochoerus penicillatus*, Gray) of the same region.

## 5. Characters of Six New Australian Land-Shells.

By JAMES C. COX, M.D., Corr. Memb.

HELIX PORTERI, mihi.

M.C.

H. *testa profunde et subobtectae umbilicata, depresso-circulari, tumidiuscula, tenui, rubida, sub lente obsolete plicato-striata, minutissime granulata setisque brevissimis confertim bullata; spira obtusa; anfractibus quatuor et semisse ( $4\frac{1}{2}$ ), convexiusculis, ultimo tumido, ad os constricto; apertura subquadrato-lunari; peristomate tenui, expanso, reflexo, intus albido, umbilicum semitegente.*

Diam. maj. 0.75, min. 0.63, alt. 0.50 unc.

Hab. Upper Clarence River, at Guy Faux Station (Porter); Upper

Richmond River, at Cowlong (in cedar-brushes under logs) (*Macgillivray*).

This shell bears much general resemblance to specimens of *H. mansueta* from the Pine Mountain, Lismore, Richmond River (which are darker than Queensland specimens); but the pilose surface, the white lip, the narrower and more covered umbilicus are very distinctive characters in *H. porteri*, which is besides closely allied to the more diminutive *H. brevipila*, and occupies a place between it and *H. mansueta*.

HELIX CONSCENDENS, mihi.

M.C.

*H. testa imperforata, globoso-turbinata, pertenui, pellucida, semivitrea, nitidiuscula, sub lente obsolete striata, albida, fascia plus minusve colorata ornata; spira conoidea, apice colorata; anfractibus sex, convexiusculis, ultimo peramplo, paululum deflexo, carina obsoleta; apertura lunato-ovata; peristomate tenui, margine externo subsinuato, columellari supra tenuiter reflexo.*

Diam. maj. 0.60, min. 0.50, alt. 0.55 unc.

*Hab.* Lismore, Upper Richmond River (on trees in the pine-brushes) (*Macgillivray*).

The band varies in intensity of colour from deep black bordered with red to reddish brown or pinkish, and in old specimens is very faintly indicated.

HELIX FENESTRATA, mihi.

M.C.

*H. testa minute umbilicata, globoso-conica, carinata, tenui, cinereo-fulva, lineis rugosis elevatis plurimis irregulariter costata cæterisque spiralibus decussata, speciem fenestratam formantibus præsertim versus apicem; spira conica, apice obtusa; anfractibus sex, convexiusculis, ultimo subacute carinato; apertura subangulato-lunata, intus margaritacea; peristomate tenui, acuto, ad columellam modice expanso et umbilicum subtegente.*

Diam. maj. 0.33, min. 0.30, alt. 0.27 unc.

*Hab.* Pine Mountain, Lismore, Upper Richmond River (on trunks of trees) (*Macgillivray*).

HELIX CORTICICOLA, mihi.

M.C.

*H. testa aperte umbilicata, depresso-circulari, nitidiuscula, epidermide fulvo-rufescente vestita, penicillis pallidioribus supra irradiata, irregulariter subcrasse costata, infra læviuscula, lineas spirales obsoletas sub lente exhibente; spira depressa; anfractibus quinque, declivi-convexis, pergradatim increscentibus, ultimo obtuse carinato, ad os obsolete; apertura lunato-subcirculari; peristomate tenui, simplici, non ad columellam dilatato.*

Diam. maj. 0.30, min. 0.25, alt. 0.15 unc.

*Hab.* Lismore, north arm of Richmond River (under bark) (*Macgillivray*).

Closely allied to *H. urarensis*.

## HELICINA DIVERSICOLOR, mihi.

M.C.

*H. testa globoso-turbinata, obsolete subcarinata, solida, superne subconica, inferne depresso-convexiuscula, basi albida, gradatim anfractu penultimo vialaceo tincta, postquam violacea, denique rubida, apice albido, sub lente transverse plicata-rugosa, anfractu ultimo pluribus lineis spiralibus aboletis; spira obtusa; anfractibus quinque, planato-convexiusculis; apertura obliqua, lunata; peristomate incrassato, modice reflexo, albo, ad columellam angulo prominente.*

Diam. maj. 0·23, min. 0·20, alt. 0·20 unc.

*Hab.* Pine Mountain, Ipswich, Queensland (*Masters*); Pine Mountain, Lismore, Upper Richmond River (on leaves and trunks of trees) (*Macgillivray*).

A somewhat variable shell in colour: it frequently has a dead and chalky instead of a porcellaneous appearance; and the red and violet of the spire are sometimes greenish, or bluish, or wanting altogether. The throat is occasionally reddish or yellowish instead of white. Queensland specimens are not in general so brightly coloured as Richmond River ones.

## PUPINA PINETICOLA, mihi.

M.C.

*P. testa ovata, nitidissima, polita, solidiuscula, hyalina; spira obtusa; anfractibus quinque, ultimo maximo, plusculum quam dimidium testæ æquante, proximo latitudine æquali, cæteris celeriter decrescentibus; apertura modice obliqua, fere orbiculari; peristomate albo, crasso reflexoque, canalibus duobus interrupta, canali superiore externaque angusto, intus plica concava prominente alba formata, canali altero ad medium oris externe aperto et columellam separante; operculo corneo, paucispirali.*

Long. 0·20, diam. 0·12, apert. 0·09 unc.

*Hab.* Pine Mountain, Lismore, Upper Richmond River (on the ground, burrowing in dry weather) (*Macgillivray*).

6. List of the Shells collected by Samuel White Baker, Esq., during his recent Explorations in Central Africa. By HENRY ADAMS, F.L.S.

## 1. LIMICOLARIA TENEBRICA, Reeve.

## 2. PLANORBIS, sp.?

This species was also brought by Capt. Speke from the Victoria N'yanza and White Nile, but I have not been able to ascertain whether it has been described.

## 3. VIVIPARA UNICOLOR, Oliv.



## 4. LANISTES, sp.?

Too immature for the species to be determined.

## 5. BITHYNIA BADIELLA, Parr.

## 6. MELANIA TUBERCULATA, Müll.

## 7. CORBICULA RADIATA, Phil.

## 8. CORBICULA PUSILLA, Phil.

## 9. UNIO ÆGYPTIACUS, Caill.

## 10. UNIO CAILLAUDI, Fér.

## 11. UNIO BAKERI, H. Ad.

*U. testa transversa, ovata, tenui, subinflata, inæquilaterali, antice rotundata, postice dilatata, subangulata, valde undulato-plicata, epidermide olivacea induta; umbonibus subprominentibus, ad apices nodosis; dentibus cardinalibus parvis, sulcatis, lateralibus subrectis, in valva sinistra duplicibus; margarita argentea et iridescente.*

Long. 30, alt. 21, lat. 14 mill.

From the Albert N'yanza.

This species bears much resemblance to *U. aferula*, Lea, from the Victoria N'yanza, but is less inæquilateral, thinner, and more corrugated. I have much pleasure in dedicating it to Mr. Baker.

## 12. UNIO ACUMINATUS, H. Ad.

*U. testa ovali-elongata, valde inæquilaterali, antice rotunda, postice subrostrata, ad umbones undulato-plicata costaque umbonali instructa, epidermide fulvo-viridi induta; umbonibus parvis; dentibus cardinalibus crassis, sulcatis, lateralibus subrectis; margaritacea et iridescente.*

Long. 29, alt. 15, lat. 10 mill.

From the Albert N'yanza.

This is an elongate species partaking of the form of *U. caillaudi*, but the ventral margin is convex and not incurved as in that species, and the surface of the valves towards the umboes is corrugated.

With the exception of the last two species, viz. *U. bakeri* and *U. acuminatus*, which are new to science, the shells in the preceding list are not of peculiar interest. The other species of *Unio* and the *Corbiculæ* are well known Nile shells; the *Limicolaria* is found at Ibu and in Guinea; and the remainder are also met with in Asia and in Northern Africa.

7. Notes on the Breeding of the Booted Eagle (*Aquila pennata*). By H. E. DRESSER, F.Z.S.

On my return to England this year from a journey through Southern Europe I remained a few days at Madrid, chiefly with the view of obtaining the eggs of some of the rarer birds frequenting the neighbourhood of that town.

I obtained great assistance from Manuel de la Torr , the chasseur who had accompanied Lord Lilford; and as I and Manuel became very friendly, I was soon made acquainted with the haunts of most of the rarer birds.

I was especially wishful to take the eggs of the Booted Eagle (*Aquila pennata*) with my own hands; and Manuel, on being applied to, at once agreed to act as guide, fixing an early day for the trip, and at the same time promised me that he would not think of returning to Madrid before we had obtained at least one nest of this Eagle.

Accordingly on the 15th of May, 1866, I was up early, and ready for a start by half-past six A.M., at which time Manuel, true to his appointment, came to my room fully equipped for the trip.

We left Madrid by rail, taking tickets to Aranjuez; but, meeting some of Manuel's friends in the train, with whom we talked matters over, it seemed from what they said that we should stand but a poor chance of success there, and we therefore determined to proceed to some station near Toledo. At Castellejo we left the train, and started off towards a belt of trees on the banks of the Tagus, some distance from the railway station. On our way we were stopped by one of the Royal keepers, who, however, on recognizing Manuel, apologized for stopping us, and, hearing on what errand we were, accompanied us for some distance. He told me that he had seen many Great Spotted Cuckoos (*Cuculus glandarius*), and had already found some of their eggs in a Magpie's nest, some miles distant from where we then were. I told him I would purchase any eggs he could procure for me; and he left us to seek for some, promising to meet me at the station in the evening if he could possibly get back in time.

On our way to the grove we saw not a few Bee-eaters and some Goldfinches, but nothing else. On entering the thicket we noticed several *Sylvia cetti* and a *Sylvia bonelli*, and found two or three colonies of *Passer hispaniolensis*. These Sparrows build their nests on the outer branches of the highest trees, quite out of the reach of any stray egg-collector who might take a fancy to their contents. In some trees I counted ten or a dozen of their nests, all built of light-coloured grasses and the cotton of the white elm tree.

Here seemed to be the very place for a naturalist; for he would certainly find no lack of specimens, and no small variety. We saw several Black Kites, Common Kites, and a Buzzard before we had walked any great distance, and on pressing through the underwood flushed a pair of Scops Owls, who, after taking a good look at

us from an old dead tree, flew noiselessly into a gloomy-looking thicket.

Manuel took me to the nest of *Aquila pennata* from which Lord Lilford procured his first eggs of this bird; but as it showed no signs of being tenanted we did not attempt to climb the tree.

Not far distant from this tree we found a nest of the Black Kite (*Milvus migrans*), from which we scared the bird, and therefore had reason to suppose that it contained something, probably eggs. However, the tree was one which promised such an amount of hard work that neither of us considered a couple of eggs of *Milvus migrans* a sufficient inducement to attempt to climb it. We therefore proceeded to force our way through the rank undergrowth, keeping a good look-out for nests, and before long were rewarded by seeing a large nest which Manuel thought looked like that of a Booted Eagle. I carried only a walking-stick gun, for the benefit of the warblers, sparrows, &c.; so Manuel posted himself close to the tree with his gun cocked, and I proceeded to kick the tree by way of giving the tenant of the nest notice to quit. I had not to kick long; for the next moment a large bird flew off the nest and was instantly knocked over by Manuel. It fell into a large bramble brake, into which we had some trouble to penetrate, but on doing so found a splendid female Booted Eagle, which, being only winged, showed fight, and gave us some trouble before we secured it.

Having secured our bird, we proceeded to examine the tree, which I had to climb, having agreed with Manuel that I should take the first and he the second. The tree was a huge and very high white elm, almost too thick to swarm up, and there was not a bough of any sort for a great height from the ground. Not getting much consolation from looking at the tree, I stripped to my shirt and trowsers and proceeded to go up. At first I mounted with great difficulty, the tree being so thick; but making use of the old knots, &c., I managed to get up until I could clasp the tree with some degree of ease, and was then soon at the first branch. The nest was placed nearly at the end of a stout limb at the top of the tree, and I had to rest several times before I reached it, but on doing so was delighted to find that it contained two eggs. These I carefully packed in a box that I carried fastened behind me to my belt; and, sitting down in the nest itself, proceeded to take notes; for I always make it a rule to take up my pencil and note-book with me.

The nest was firmly placed between three branches, was built entirely of thin sticks, twigs, and some dead bramble-branches, and was lined to the depth of about 2 inches with fresh green leaves off the tree itself. These must have been plucked that same morning; for some, which I put into my collecting-box, were quite hard and dry in the evening. This puzzled me not a little; for it looks as if the bird relined the nest every morning, as the leaves would not remain fresh over the day. In diameter the nest was two spans and a knuckle ( $19\frac{1}{4}$  inches) outside, and just one span ( $9\frac{1}{4}$ ) inside, not much depressed inside, and rather bulkily built. In the foun-



dation of the nest itself were two nests of *Passer hispaniolensis*, neither of which, however, contained eggs, the one being only half finished.

In the branches close to the Eagle's nest were several more Sparrows' nests; and in a rotten limb a few feet below was a new nest of *Picus minor*, and close to it an old nest of the same bird.

The eggs of *Aquila pennata*, which now are (with the exception of the nest-stains) pure white, were, when quite fresh, white with a faint greenish tinge. In shape and size they much resemble the eggs of *Astur palumbarius*; but the shell is somewhat more coarse-grained. The above-mentioned eggs were quite fresh, one of them having probably been laid the previous day.

Having rested myself and scribbled down the above notes, I descended the tree, getting down with much greater facility and speed than I ascended. Manuel had gone off; so I sat and waited for him, and in the meantime noted down the colours of the cere, iris, &c. of the bird itself, which I copy as follows:—Cere and feet light wax-yellow; claws black; beak at cere light blue, darkening towards the tip into a dark horn-blue colour; iris light brown.

Having done this I sat down and watched what birds were to be seen. In the distance I could hear the "hoop, hoop" of the Hoopoe; and a Roller came and perched on a tree not far off.

Before long *Picus minor* made his appearance, and seemed not a little satisfied that his home had remained undisturbed. High above me the mate of the wounded Eagle was circling, keeping, however, so far off that there was no chance of obtaining a shot at him. After waiting a short time I heard some one pushing his way through the brambles; and soon after, Manuel appeared, bringing with him a nest and four eggs of *Fringilla carduelis* that he had found.

He proposed that we should skirt along the river-bank, and thought that he knew of a place where we might find *Caprimulgus ruficollis*. We were, however, not fortunate enough to find any, although we searched carefully for some time.

At one place on the river-bank we found a colony of *Merops apiaster*, numbering some 200 or 300, preparing their nests in a sandy bank, but we were too early to find any eggs.

After walking along the river-side for nearly an hour, and finding three nests of *Milvus migrans* and two of *Milvus regalis*, we saw, in a huge old white elm tree overhanging the river, a nest which Manuel assured me was that of a Booted Eagle, and which he thought probable might contain something. We pelted the nest for some time, but no bird left it; and getting tired of pelting, I at last fired a charge of dust-shot at the nest, with, however, no effect beyond that of driving out several Sparrows, which evidently had nests in its foundation. I therefore concluded that there was no bird on the nest, and proposed that we should search further; but Manuel refused, saying that he thought it worth while to climb up to the nest, it being his turn.

The tree was so bulky that he could not climb up the trunk; but with my assistance he managed to reach the first branch, which was not far from the ground. Here he was again unable to climb up the trunk, and had to go to the end of a branch, and pulling down the branches above dragged himself up by them. However, to cut matters short, he succeeded after some time in climbing to the limb on which the nest was placed, and then, to my great astonishment, out flew the Eagle, which had sat quiet during the whole time we had pelted and fired at the nest.

Manuel soon reached the nest, and reported that it contained two eggs, and in structure &c. was similar to the last nest, being also lined with fresh green leaves off the same tree in which the nest was placed, some of which he threw down for me to examine. Just below, in a hollow hole, was a nest of *Strix flammea*, but Manuel could not get at it. The old bird flew out, and I shot it.

In the foundation of the Eagle's nest were three nests of *Passer hispaniolensis*, one of which contained five, and another six eggs.

Manuel had great difficulty in descending, and in one place slipped, unfortunately smashing one of the Eagle's eggs in such a manner that we had to throw it away. These eggs were slightly incubated.

During the whole time that Manuel was in the tree, the Eagles circled round above, far out of shot; but as we were going away the female flew so close that Manuel shot her, which I was sorry for, as I did not wish her to be shot. As it was we did not get her, as she fell into the river and was carried down by the current.

It being now late in the afternoon we turned our faces towards the railway station, taking, however, another route back, in hopes of finding another nest of *Aquila pennata*, but met with nothing, excepting one nest of *Milvus migrans*. We saw a Black Stork (*Ciconia nigra*), several Kestrels, three or four Scops Owls, many Serin-finches and Goldfinches, Woodchats, Bee-eaters, and other common birds, but nothing of note.

#### 8. Supplementary Notes on the Red-bellied Monkey (*Cercopithecus erythrogaster*, Gray). By JAMES MURIE, M.D., Prosector to the Society.

With the typical specimen of a species, as a matter of future reference, it is useful to collect and put on record all details concerning it. For this purpose I contribute the following additional slight data on the new species of West African Monkey (*Cercopithecus erythrogaster*), of which a notice was given by Dr. Gray in March last (P. Z. S. 1866, p. 168). His short graphic diagnostic characters well point out the external peculiarities, leaving nothing to be desired in that respect.

The admeasurements taken of the dead animal furnish the accompanying table:—

|   | inches.          |
|---|------------------|
| Body: length from nose to end of tail (in a straight line) ..                                     | 29 $\frac{1}{4}$ |
| „ length from nape of neck to root of tail. ....  | 11               |
| „ girth of chest (at widest) .....  | 8                |
| „ girth of abdomen (at widest) .....  | 8                |
| Tail, in length (its point being imperfect) .....   | 16               |
| Fore limb: length from shoulder to tip of middle digit ..   | 10               |
| „ length from shoulder to elbow .....   | 4                |
| „ length from elbow to wrist .....  | 4                |
| „ length of manus .....   | 2                |
| Hind limb: length in a straight line .....  | 12 $\frac{1}{2}$ |
| „ length from hip to knee .....   | 4                |
| „ length from knee to ankle .....   | 5                |
| „ length of foot .....  | 4                |
| Head: length from nose to occiput (following curve) ....  | 5                |
| „ breadth between the ears .....  | 4 $\frac{1}{4}$  |
| „ width between the malar bones .....   | 2                |
| „ width between the outer angles of the orbits .....  | 1 $\frac{1}{2}$  |
| „ width between the centres of the two orbits .....   | 0 $\frac{8}{10}$ |
| „ distance from tip of nose to meatus auditorius ....   | 2 $\frac{3}{4}$  |
| „ distance from top of skull to the inferior edge of the<br>lower jaw (following the curve) ..... | 2 $\frac{3}{4}$  |
| „ girth of head before ears, including mandible ....  | 7 $\frac{1}{2}$  |
| „ ears in length .....  | 1                |
| „ ears in breadth .....   | 0 $\frac{3}{4}$  |

To preserve the form of the head in the stuffed specimen (now deposited in the British Museum) the skull was retained in the skin; consequently the cranial bones were unable to be examined. The dentition, however, corresponds to the immature condition of the genus *Cercopithecus*, the canines (*laniarii*) being very moderately developed.

Dental formula :—Incisors  $\frac{2-2}{2-2}$ . Canines  $\frac{1-1}{1-1}$ . Premolars  $\frac{1-1}{1-1}$ .  
Molars  $\frac{3-3}{3-3}$ .

The opportunity fortunately occurred of comparing its viscera, side by side, with those of a specimen of *Cercopithecus diana*, Linn., and of *C. cephus*, Erxl. There is a correspondence between the three; but the first two agree most closely in several particulars.

In *C. erythrogaster*, as in them, the right lung has four lobes, the left one only two, of which the upper lobe is deeply cleft. The heart presents nothing remarkable.

The stomach is ovoid in figure, with the fundus bulging slightly upwards. There are no sacculations as in the genera *Colobus* and *Semnopithecus*. The œsophagus enters nearly midway between the cardiac and œsophageal ends. The transverse diameter from the fundus to the cardiac extremity measures 3 $\frac{1}{4}$  inches—in a specimen of *C. diana* about the same age and size, 3 $\frac{1}{2}$  inches—and in the Moustache Monkey (*C. cephus*), with a body greater in dimensions, only 3 inches. The opposite diameter, viz. from the œsophagus to



the greater curvature, is  $2\frac{1}{2}$  inches in *C. erythrogaster*, 2 inches in *C. diana*, and  $1\frac{1}{2}$  inch in *C. cephus*, showing this organ to be comparatively the smallest in the last-named species.

The ductus communis choledochus enters into the small intestines an inch beyond the pylorus in the first of these three specimens. In it also the small intestines measure 73 inches in length, while in *C. diana* they have a length of 60 inches, and but 52 inches in *C. cephus*, although the last animal is the largest. The cæcum in each of the species is of the same simple cylindrical shape, but it is a quarter of an inch longer in *C. cephus* than in the other two, in which its length is  $1\frac{1}{2}$  inch. The great intestines, including the cæcum, measure  $22\frac{1}{2}$  inches in *C. erythrogaster*. For about 13 inches from their commencement they are of equal diameter, viz. an inch; then they diminish to half that diameter, which continues onwards to the anus. The sacculations formed by the constricting transverse fibres are narrow and not at all prominent. The differences observed in the great intestines of *C. diana* are these—their being half an inch shorter, and the commencing wide portion also correspondingly of less length than that already given of the new species. *C. cephus* has the great intestines even 1 inch shorter than the last mentioned, and their diameter is altogether somewhat greater than in either of these *Cercopithec*i; the more capacious portion towards the cæcal end is as much as a couple of inches shorter.

The liver in *C. erythrogaster* is composed of five distinct lobes, as in the two allied species. The right lobe is of moderate size, with a thickish lobus caudatus situated at its base. The cystic lobe is rather larger than the right lobe, and with the gall-bladder sunk into a sulcus in its substance. The fourth lobe lies between the cystic and left lobe; it has a deep cleft or pit for the insertion of the round ligament. The left lobe is rather smaller than the right, and is conjoined with the main part of the body of the liver by a narrow neck.

The kidneys are each  $1\frac{1}{2}$  inch long. There is nothing peculiar in the other organs.

The point of interest in the comparison of the viscera of the three specimens referred to appears to be, that in some species of *Cercopithecus* there is a variation in the size and length of the alimentary canal; but whether this corresponds to the minor grouping of the species which some have adopted is a matter requiring more extended examination than the present imperfect observation affords.

The morbid appearances observed in this specimen of Red-bellied Monkey were miliary tubercles of the spleen, with hardening of the pancreas and enlargement of the mesenteric glands.

With respect to its habits during the two months it lived at the Gardens, the following may be said:—Its nature appeared mild and harmless, by no means grave or sedate, indeed rather inclined to be lively and playful, but with little disposition to be quarrelsome. The keeper noticed that it appeared timid, and somewhat distrustful of its more romping companions, but freely approached him, and when taking food out of his hand seemed pleased and gently played with his fingers without attempting to bite.

9. On the Anatomy of the Crested Agouti (*Dasyprocta cristata*, Desm.). By ST. GEORGE MIVART, F.Z.S., Lecturer on Comparative Anatomy at St. Mary's Hospital, and JAMES MURIE, M.D., Prosector to the Zoological Society.

The animal, the dissection of which forms the subject of the present communication, died lately in the Society's Gardens. It had lived above four years in the collection, having been originally presented to the Society by Captain M. D. Stewart in October 1861.

#### EXTERNAL CHARACTERS.

With reference to general appearance, our specimen corresponded to Mr. Waterhouse's\* description of the variety of *Dasyprocta cristata*—the crest of the head being black, the loins and hinder portions of the body bright rust-colour, the hairs of the latter parts very slightly annulated with black.

Professor Rymer Jones† says that there are in the Agouti as many as from twelve to fourteen nipples; and Mr. Waterhouse‡ notes that, according to Desmarest, there are in *D. cristata* six mammæ, whilst *D. aguti* has twelve; but he himself found eight teats both in *D. punctata* and in *D. acouchy*. The specimen brought under our consideration confirms Mr. Waterhouse's observations, possessing as it does four pairs of teats, the foremost (as in *D. punctata*) being axillary, while the hindmost are situated in the inguinal region.

It may be interesting to note some of the outward differences exhibited by the feet of *Dasyprocta cristata* as compared with those of *Cavia aperia* and *Lepus timidus*, corresponding as they do to some extent with the distribution of the muscles and tendons.

In the first-named species the back of the fore foot is sparsely clothed with hair, which on the inner side is shorter, finer, and lighter in colour. The nails are nearly straight, solid, and broader than in the Hare. The sole, which is bare, has three pads (see fig. 1, *A*)—a large semilunar one posteriorly, a small roundish one at the base of the index, and another larger irregularly oval-shaped and slightly divided one (also proximally situated) between the third and fourth digits. There are likewise numerous wrinkles, running in the main transversely, producing on the toes somewhat the appearance of scales. The pollex is a mere tubercle hidden by a portion of the posterior pad, so that externally four toes only are to be observed.

The foot of the Guinea-pig, besides its smaller size, differs from that of *D. cristata* in the less wrinkled condition of the sole, in having four distinct pads, the anterior one being the largest, and in all of these having a thicker cushion of fat (fig. 1, *B*).

\* Nat. Hist. Mamm. vol. ii. pp. 384, 385.

† Cyclopædia of Anatomy and Physiology (1852), vol. iv. p. 396.

‡ *Loc. cit.* p. 384 (footnote) and p. 393 (text).

Fig. 1.



*A.* Sole of left fore foot, and *C* of left hind foot, of Crested Agouti. *B.* Sole of left fore foot, and *D* of left hind foot, of Guinea-pig. Natural size.

In the Hare there are five toes visible, which are much longer and hairy; and there are no pads perceptible, even when the hairs are removed.

In the hind foot of the Crested Agouti, which has but three toes, the tarsus is long, narrow, and bare. On the sole are two small

oblong pads, situated at the base of the innermost toes, the smaller one being internal, having at a distance of less than half an inch behind it a trace of a third pad. Beneath the metatarsals there is a good deal of transverse wrinkling, and underneath the digits the same scaly appearance as in the digits of the fore foot (fig. 1, *C*).

The Guinea-pig has a hind foot in some respects very like this; but the pads are comparatively larger, and the external one much the larger of the two; the three toes also are of nearly equal length (fig. 1, *D*).

The Hare has four toes, with fur on the sole; and when the fur is removed neither pads nor wrinkles are to be distinguished. In the length and shape of the sole and toes the Hare's foot approaches that of the Agouti's; but the number of digits, with the other differences, are marks of the separation between *Lepus* and the two genera of the *Hystriidae*.

#### MORBID APPEARANCES.

Those exhibited on opening the visceral cavities were the following:—Congestion of the lungs, more particularly the lobes of the right one. In both lungs, moreover, were innumerable specks of melanotic deposit, each spot not above the size of a pin's head, but the whole giving to the pulmonary tissue the characteristic appearance of incipient melanosis. All the other viscera, as well as the brain, seemed healthy; but there was a more than natural effusion of serum in the cavity of the abdomen.

#### VISCERA AND GENERATIVE ORGANS.

A good account of the viscera of *Dasyprocta acuschy* (Illig.) has already been given by Professor Owen\*; and, a few years later (1834), in some notes also read before this Society, Mr. Rymmer Jones† described with considerable minuteness those of *Dasyprocta aguti*, Illig. A complete redescription may therefore be considered unnecessary.

Prof. R. Jones mentions that, in the specimen of *D. aguti* dissected by him, the stomach had a remarkable constriction between its cardiac and pyloric orifices, which gave it the appearance of consisting of two distinct cavities. Our observation of this viscus in *D. cristata* agrees with that of Prof. Owen, who found it in *D. acuschy* altogether simple and without such a contraction.

The shape and relative position of the intestinal tract in *D. cristata* resembles the description given by these authors of the species dissected by them. But we found in it that the small intestines were about 4 feet shorter than in *D. aguti*, namely 208 inches in total length. The large intestines, on the other hand, measured 45 inches, being thus almost double the length of the same in *D. aguti* according to Prof. R. Jones. The cæcum also differs from that of *D. aguti*, being both longer and wider—10 inches in length, and about 4 inches in circumference.

\* P. Z. S. 1830-31, p. 75.

† P. Z. S. 1834, p. 82.



There is little difference in the liver, except that the posterior surface of the left lobe has several superficial sulci, possibly a mere individual peculiarity. The gall-bladder is  $1\frac{1}{2}$  inch long, extending beyond the margin of the right division of the cystic lobe, and not deeply buried in a fissure as in *D. aguti*.

The heart\* has the slight tendency to a double apex remarked by Prof. Owen in *D. acuschy*.

The lungs have the same number of divisions as in the allied species.

The kidneys answer Owen's description of these organs in *D. acuschy*, rather than that of Jones in *D. aguti*, not possessing the separated portion spoken of by the latter observer.

The external organs of generation and anus are closely approximated, indeed almost forming a cloaca. The urethra (p. 406. fig. 4, *U*) opens about  $\cdot 2$  inch in front of the vulva. The latter (fig. 4, *V*) lies  $\cdot 4$  inch in front of the anus, and its lips exhibit numerous folds. The anal opening (fig. 4, *A*) has immediately behind it a semilunar fold of skin, the convexity of which is posterior. On either side of the anus the fold of membrane forms a deep pouch lined with short hairs, and having numerous minute openings of muciparous glands, and others which give exit to the ceruminous secretion of the anal scent-glands (pp. 406, 410. figs. 4 & 5, *A. g*). These anal glands are two in number, and prominently situated one on each side of and rather behind the external genitals.

They are almond-shaped, and each about an inch in length, and their structure consists of many larger and smaller cavities divided by fibrous walls. The interiors of these cavities or loculi are lined by mucous membrane, which abundantly secretes the viscid yellow substance which is not unlike the cerumen of the ear†. Each gland opens, as above said, by numerous apertures into one of the pouches of the semilunar-like fold.

The figure (fig. 4) which we have given shows the appearance of these glands and the neighbouring parts in a partially dissected condition, and in a female specimen. Their outward or tegumentary aspect in the male animal is admirably depicted by John Hunter's artists, Bell and Rymseyk, in the fourth volume of the 'Illustrated Physiological Catalogue of the College of Surgeons,' plates 52 and 53.

The urinary bladder is a narrow elongated pyriform-shaped viscus, about 3 inches in the length of its cavity; but the distance from the fundus to the orifice of the urethra is altogether about 6 inches, the part, however, which may be regarded as the neck being comparatively wide: this at least was the case in our female specimen.

The ureters open on either side of the bladder, not far from the fundus.

The vagina is rather wide, and  $3\frac{1}{2}$  inches in length from the os to the vulva. The mucous membrane is longitudinally plicated all this distance.

\* Dr. Crisp states that this organ in the Hare is nearly five times the weight of that of the Rabbit, the lungs of the former nearly four times as heavy, and the calibre of the trachea nearly four times as great (P. Z. S. 1861, p. 86).

† As Prof. Rymer Jones has already remarked (P. Z. S. 1834, p. 82).

The uterus is nearly an inch long from the fundus to the os tinæ, and its cavity is divided by a median septum to within 0·2 of an inch of the latter part. Each cornu is continued from the fundus of the uterus for  $1\frac{1}{2}$  inch, and is almost as wide as each of the divisions of the body of this viscus.

The ovaries are small. The broad ligaments as a whole are thin, but have a great number of parallel slightly contorted tubules running from each Fallopian tube towards the pelvic attachment of the ligament. These evidently represent the remnants of the Wolffian ducts.

#### VASCULAR SYSTEM.

The arch of the aorta is short and narrow, the arteria innominata, left carotid, and left subclavian arteries are given off close together, and they are of nearly equal size. The arteria innominata is 0·4 inch long to where it gives off the right carotid. About 0·25 inch from this is the vertebral artery, which is of narrow calibre; immediately beside it to the right, and from the same (anterior and inferior) side of the subclavian the inferior thyroid, supra- and posterior scapular branches are derived. These can hardly be said to spring from the thyroid axis, but diverge along with the vertebral artery from the main trunk. The internal mammary arises on the opposite (posterior or superior) side of the subclavian to those above mentioned, and it proceeds into the thoracic cavity behind the whole of the rib-cartilages.

The superficial femoral artery is given off from the larger and deeper femoral artery below the crural arch. It divides half an inch below this,—one, moderate-sized division going outwards, which at about an equal distance again divides into two—one of these last branches supplying the tensor vaginæ femoris, the other piercing the rectus muscle superficially and vastus internus beneath, also sending off slight twigs to the inside of the glutens maximus.

The second, larger and longer division, accompanied by the saphenous nerve, passes quite superficially down the limb, crossing at an acute angle the shaft of the femur. It is adherent to the gracilis muscle opposite to the head of the tibia, and just where its fibres become aponeurotic (see fig. 4). Crossing the lower fifth of the shaft of the tibia it reaches the dorsum of the foot beneath the tibialis anticus tendon, and it then proceeds forwards between the inner and middle metatarsal bones. Previously to crossing the tibia a branch is sent to the inner side of the os calcis.

The deep femoral artery is much greater in calibre than the superficial femoral. There are numerous small muscular branches given off in the groin. As it continues downwards it lies upon the adductor magnus, but does not pierce the muscle; so that there is no Hunter's canal.

Twigs are given to the adductors and sartorius. At the lower border of the adductor magnus it sends a large off-shoot to the semi-membranosus, while the main trunk continues to the popliteal space close behind the femur.

The popliteal artery is but a series of branches of the femoral,—the main arterial trunk, the continuation of the femoral, being hardly distinguishable by size from the numerous usual muscular and articular branches. The divisions commence just above the origin of the gastrocnemius muscle.

Besides the (four) superior and inferior articular branches there is a middle or azygos artery of small size which pierces the fascia close to the tibia. The two larger branches, supplying the gastrocnemius and other muscles of the calf, are given off highest.

The posterior tibial, anterior tibial, and recurrent arteries are given off together from the popliteal, and about opposite the condyles of the femur. The first of these runs alongside the highest and deepest branch of the ischiatic nerve, and about the upper one-fifth of the shaft of the tibia it pierces the deep flexor muscles of the leg, and then proceeds downwards.

The second or anterior tibial artery passes deeply over the popliteus muscle and between the tibia and fibula, running down the anterior surface of the interosseous ligament to the ankle-joint.

The third or recurrent artery passes outwards beneath the external head of the gastrocnemius.

The continuation of the anterior tibial at the ankle-joint inosculates with the inferior extremity of the superficial femoral artery, and then proceeds between the two inner metatarsal bones from the dorsum of the foot to the sole near their distal extremities, and there supplies three digits on their plantar aspect. A branch at the malleolus comes from the above and dips between the cuboid and external cuneiform, forming a deep palmar arch of two branches. This communicates with the superficial plantar arch above described.

### NERVOUS SYSTEM.

The great sciatic nerve, which is large, passes beneath the pyramiformis muscle. Emerging from below this and through the great ischiatic notch, it passes down the back of the thigh beneath the flexor muscles, but not close to the thigh-bone. Opposite the lower end of the shaft of the femur it divides into the smaller (external) and larger (internal) popliteal nerves.

The external popliteal is continued as the peroneal nerve, and goes beneath a small tendinous slip of the outer head of the gastrocnemius, and also the peroneal muscles just below the projecting processes of bone on the outer head of the fibula; thence it descends in front of the interosseous membrane alongside of the extensor muscles to the ankle, and onwards to the dorsum of the foot, branches being given off at the ankle-joint.

The internal (or posterior tibial) nerve divides into two branches:—one, the outermost, supplying the large superficial flexor muscles; the other dividing lower down opposite the joint into an internal deep branch going to the deep flexor muscles, and a more superficial one which proceeds to the inner side of the projection of the os calcis and then splits into smaller branches.

The lesser sciatic nerve is comparatively large, and is given off from the sacral plexus and great sciatic beneath the pyriform muscle. It lies upon the tuberosity of the ischium, and separates into several branches, which supply the conjoined gluteus maximus and biceps, the semitendinosus and semimembranosus, besides several other muscles.

#### MUSCULAR SYSTEM.

The anatomical structure of the genus *Dasyprocta*, in so far as the muscular system is concerned, has hitherto only been described in a somewhat fragmentary manner, principally by Meckel. Moreover, as the comparative relation of the myology in the Rodentia is interesting, we have thought this portion of the record of our dissection of *D. cristata* might be useful as helping to form a groundwork for further investigations with regard to that group; for which purpose we have more particularly compared it with dissections made by us of the Guinea-pig, Hare, and Rabbit, availing ourselves at the same time of the labours of other observers on certain species of the order.

We may remark *en passant* that the flesh of the body of the Crested Agouti has a resemblance to that of the Common Hare, both in colour and in the absence of interstitial fat.

#### *Muscles of the Head and Neck.*

The *temporal*, compared with some of the muscles of mastication, is small, as it is in most of the Rodents. Its origin and insertion present nothing remarkable, excepting in its perpendicular pulley-like position and action round the posterior base of the zygomatic process.

In the Guinea-pig it appears to be single and like the above.

In the Hare this muscle is also feeble, but somewhat divided into two bellies, as Meckel\* has stated.

*Masseter.* This muscle in the Crested Agouti, as in many of the Rodents, is composed of more than one layer. We found it divided into three distinct portions, somewhat in the manner described in the notes to the French translation of Meckel†.

The first portion (jugo-maxillien) is the largest and most superficial. It arises from the whole length of the zygomatic arch, as far forwards as opposite the first molar tooth; and it is inserted into the outer surface or ridge and lower margin of the mandible, some of the fibres turning round and being fixed into the inner face of that bone. The anterior border of this portion has a very strong superficial tendon.

The second, smaller portion (mandibulaire) lies beneath the first, and is a muscular slip, also stretching from the zygomatic arch (its anterior end) to the mandible (its outer surface).

\* Anat. Comp. traduit par MM. Riester et Alph. Sanson, Paris, 1829-30, vol. viii. p. 577.

† *Loc. cit.* p. 580 (footnote). At p. 328 in the same volume it is noticed that in its complete state the masseter is divisible into three muscles, viz. the jugo-maxillien, the mandibulaire, and the mandibulo-maxillien.



The third portion (mandibulo-maxillien of notes to Meckel) forms a flat muscular arch, with an anterior peak, attached to the side of the superior maxillary bone and partly beneath the orbit. The fibres converge and end in a very powerful glistening tendon, which is inserted into the anterior end of the external ridge of the mandible nearly opposite the first molar.

With regard to the action of this muscle, our observation corroborates Meckel's annotators, who state that the first portion produces both an antero-posterior and up and down movement of the mandible, while the third portion, from its pulley-like position and attachments, only raises the lower jaw.

Mr. Waterhouse\* particularly calls attention to the constancy of the double arrangement of the masseter in the *Hystrioidæ*, and figures that of the Agouti and others; but he does not speak of the other, smaller slip mentioned in Meckel's work.

The *buccinator* is very largely developed, and extends from the mandible to the maxilla.

It is also large in the Guinea-pig.

The *digastric* muscle is large, normal in origin and insertion, and has a median tendon.

It is the same in the Guinea-pig, where it lies very deeply.

In the Hare this muscle is very remarkable, as it possesses no posterior fleshy belly, but its hinder half is merely a long tendon.

Cuvier† remarks that there is but one belly in the digastric of the Rabbit.

The *sterno-mastoid* arises from the outer side of the elongated manubrium, immediately beneath the third part of the pectoralis major (p. 396. fig. 2, *St. m*). Passing forwards and upwards‡ it is inserted by a strong tendon into the anterior aspect of the paroccipital process.

The *cleido-mastoid* is smaller than the preceding, and arises from about the middle of the clavicle (p. 401. fig. 3, *Cl. m*)§, being inserted broadly into the paramastoid process behind and beneath the sterno-mastoid.

In the Rabbit and Hare the sterno-cleido-mastoid is also separated into two distinct portions as in *D. cristata*. In the Guinea-pig, according to Meckel||, with whom we agree, the cleido-mastoid, or posterior half, differs from the above in being the larger portion of the two. Moreover he says, "elle se confond tout-à-fait avec le deltoïde dans sa partie inférieure;" but what he takes as part of the deltoid, we are inclined to consider a clavicular part of the pectoralis major.

The *sterno-hyoid* and *sterno-thyroid* muscles arise in common

\* Nat. Hist. Mamm. vol. ii. p. 151 and pl. 6 a. f. 1-4.

† Leçons d'Anat. Comp. tome iv. première partie, p. 93.

‡ It must be understood that in our use of the terms "forwards," "upwards," "anterior," "inferior," &c., we describe the animal as in the horizontal position of a quadruped: therefore what in human anatomy would be spoken of as "superior" is here "anterior;" and in the same manner "posterior" becomes "superior," and *vice versa*.

§ Meckel, Anat. Comp. vol. vi. p. 164.

|| Loc. cit. p. 164.

from the inside of the sternum, opposite the cartilage of the first rib, and, continuing forwards (upwards) closely united in part, ultimately separate and have their usual insertions.

The same in the Hare and Guinea-pig.

The *omo-hyoid* is wanting.

The *levator claviculæ* is very remarkable in having an origin by tendon from the basis cranii, immediately to the inner side of the auditory bullæ and directly behind the tendon of the anomalous scalenus anticus. It is inserted into the clavicle, towards its outer end, immediately opposite the origin of the fourth part of the pectoralis major.

On the right side we found this muscle closely adherent to the cleido-mastoid above; but near the clavicle the external jugular vein and carotid artery separated them, after which the two muscles proceeded side by side to the somewhat rudimentary clavicle, the levator claviculæ being inserted outermost.

On the left side we found no such union with the cleido-mastoid above; but instead the muscle divided (at the anterior third of the distance between the atlas and clavicle), its broader portion, partly adherent to the trapezius, passing over the shoulder-joint onwards as far as the proximal end of the forearm, simulating a cephalo-humeral (figs. 2 & 3, *L. c.*). But we believe it cannot be a cephalo-humeral, because there is a distinct cleido-mastoid, as before described, entirely distinct and superficial to this abnormally enlarged portion of the levator claviculæ.

It is this portion which evidently has led Meckel\* to consider this muscle to be represented by the anterior part of the trapezius in the Agouti.

Prof. Owen† makes mention of the levator claviculæ being present in two specimens of the *Dasyprocta acuschy* (Ill.) dissected by him.

We ourselves noted its existence in the Guinea-pig, Hare, and Rabbit,—in the former being inserted into the metacromion process of the scapula; in the two latter it is carried, along with the trapezius, over the shoulder-joint, fibres passing to the upper part of the humerus.

In the Hare the levator claviculæ is like that which we found on the left side of *Dasyprocta cristata*, but without the long descending portion to the forearm, rather stopping short at the metacromion process.

The *rectus capitis anticus major* is but indistinctly separated from the longus colli, unless what we have called the scalenus anticus should in reality be this muscle, the insertion‡ of which, however, it must be remembered, is into the first rib, therefore entirely different from that of the rectus capitis anticus major as it ordinarily exists in man. Should our interpretation be correct, the muscle in ques-

\* *Op. cit.* vol. vi. p. 239.

† P. Z. S. 1830-31, p. 76.

‡ Speaking generally, the *insertion* is oftener to be relied on as indicative of homology than the *origin* of a muscle—although, perhaps, this rule is more strictly applicable to the limbs than elsewhere.

tion is probably represented by what has much the appearance of the most anterior (upper) part of the longus colli. This arises by tendon and muscular fibre from the transverse processes of the second and third cervical vertebræ, and is inserted partly into the hypapophysis of the atlas, and partly into the basis cranii in front of the tendon of origin of the scalenus anticus.

It is the same and strongly developed in the Guinea-pig.

The *rectus capitis anticus minor* is more easily defined than the preceding muscle. Its attachments of origin are the transverse process of the atlas and part of the body of that vertebra; it is inserted into the basis cranii, immediately behind the origin of the levator claviculæ, with which, moreover, it is more or less fused.

It is alike in the Guinea-pig.

The *rectus lateralis* is large and fleshy; it passes, as usual, from the transverse process of the atlas to the skull.

*Longus colli.* If we consider the muscular belly described as the rectus capitis anticus major to be really such, and not a part of the muscle now under consideration, then the longus colli extends between the transverse processes and bodies of the vertebræ from the seventh dorsal to the atlas—no fibres, however, being attached to the transverse processes of the dorsal or first three cervical vertebræ.

It is exactly the same in the Guinea-pig.

*Scalenus anticus.* This presents very interesting characters, both as to its form and origin. It is a very long thin band of muscle, tendinous on its lower surface, and arising by a strong tendon from the basis cranii, immediately in front of the origin of the levator claviculæ, but rather nearer the middle line. It is inserted upon the anterior margin of the first rib, between the subclavian vein and artery, and altogether beneath (in front of) the bronchial plexus.

Meckel\* says that this muscle is absent in the Agouti.

This muscle is the same in the Guinea-pig; and here the tendon of origin from the basis cranii is very delicate.

In the Hare this muscle seems to be wanting.

The *scalenus medius* and *s. posticus* are one very large posteriorly expanded and conjoined muscle in the Agouti. It arises from the whole of the transverse processes of the cervical vertebræ, including the atlas, and not, as Meckel† says, from only the last five. It is inserted into the first five ribs.

In the Guinea-pig it is very similar, and strongly developed.

In the Hare there are two muscles, the external superficial one of which arises from the transverse process of the fifth cervical vertebra and is inserted into the three foremost ribs. The deeper and shorter one arises from the transverse process of the sixth cervical vertebra, and is inserted into the first rib, outside and superficial to the vessels and nerves.

#### *Muscles of the Back and Abdomen.*

*Panniculus carnosus.* The very lean condition of our specimen permitted this muscle to be well seen in its entire extent (figs. 2 & 3,

\* *Op. cit.* vol. vi. p. 157.

† *Loc. cit.*

*P. c*). It corresponds very nearly to our description of the same muscle in Hyrax\*. It is also wonderfully strong in the Rodents selected for comparison, most so perhaps in the Guinea-pig.

The *latissimus dorsi* takes origin from the dorsal and lumbar vertebræ, and is likewise attached by a fascia to the surface of the *infra-spinatus* muscle. It has an insertion by tendon, as usual, in common with the *teres major* (figs. 2 & 3, *L. d.*). It sends off a small dorso-epitrochlear slip (figs. 2 & 3, *D. e.*) to the ulnar side of the olecranon. This last we noticed in the Guinea-pig, but not clearly in the specimens of Rabbit and Hare.

The *trapezius* is very extensive and elongated (fig. 3, *Tra.*). Muscular fibres come from the spines of the fourth to the eleventh dorsal vertebræ, covering the *latissimus dorsi*, and proceeding outwards and forwards are partially inserted into about the middle of the spine of the scapula.

A strong tendinous fascia continues onwards, joining the almost distinct anterior portion, which may be said to arise from the occiput and *ligamentum nuchæ*, to be inserted into the anterior edge of the spine of the scapula and metacromion process, a slip of fibres proceeding down the side of the limb as far as the middle of the humerus. In the neck the fibres join those of the *levator claviculæ*.

There is no characteristic difference in the Guinea-pig.

In the Hare the nuchal portion is very thin, and the dorsal portion goes as far backwards as the twelfth or thirteenth vertebra.

In the Rabbit this muscle appears to join the *latissimus dorsi* posteriorly. In neither of these three animals is the long humeral slip so strongly developed as in the Agouti.

*Rhomboideus*. There is no distinction between the *rhomboideus major*, *minor*, and *capitis*; but one continuous sheet of muscle arises from the paramastoid process of the occiput, the median line of the neck, and the dorsal vertebræ. Its insertion is into the vertebral border of the scapula.

Meckel says (*loc. cit.* p. 242), "*Le Porc-épie et la Marmote parmi les Rougeurs n'ont qu'un rhomboïde, mais il y est très-développé, il vient de l'arcade de l'occipital,*" &c.

In the Hare, Rabbit, and Guinea-pig we find a distinct *rhomboideus capitis* muscle, which arises by delicate narrow fibres from the occiput, and, broadening as it proceeds backwards and outwards, is inserted into the anterior end of the vertebral border of the scapula.

In them also the *rhomboideus major* and *minor* are interblended.

The *serratus magnus* and the *levator anguli scapulæ*, indivisibly united together, form another extensive layer of muscle. Origin: the transverse processes of all the cervical vertebræ and the first eight ribs. Insertion: the spinal border of the scapula beneath the *rhomboideus*.

In the Guinea-pig, Rabbit, and Hare there is a line of separation between the *serratus magnus* and *levator anguli scapulæ*, opposite the third rib; the last portion has the greatest amount of attachment to the scapula.

\* P. Z. S. 1865, p. 335.



*Serratus posticus*. This is one single sheet of muscle and fascia, answering in all respects to the description given of that in *Hyrae*\*, with the exception that it reaches only to the fifth rib. Its fibres, moreover, have a uniformly oblique direction, and take origin from the ligamentum nuchæ by a strong tendon.

Meckel† avers that in some Rodents, principally the Agouti, Marmot, and Beaver, it goes to all the ribs except the first. It was not so in our specimen, and the alteration in the direction of the fibres was not so clearly shown as Meckel has described.

We have found it in the Hare and Rabbit very thin and delicate, almost like a fascia, except at the anterior part, where there are a few muscular fibres. It appears to go to most of the ribs in the Hare, indeed to all except the three anterior ones. In the very fleshy old male Guinea-pig examined by us it was distinct and strong from the third to the eighth or ninth rib.

The *sacro-lumbalis* has its usual attachments, and, emerging from the mass of the erector spinæ, is prolonged, as the cervicalis ascendens, to the transverse process of the sixth cervical vertebra. In the other three Rodents it did not seem to reach further than the seventh cervical.

The *longissimus dorsi* is very much larger and more fleshy than the preceding, but also has the ordinary attachments. It is prolonged into the neck as a transversalis cervicis as far as the atlas, strong tendons going to all the cervical vertebræ. It is the same in the Guinea-pig. In the Hare, only as far as the axis? But in the Rabbit it is, as Professor Huxley‡ has observed, very powerful and attached to the large metapophysial processes.

The *external oblique* is a most extensive sheet of muscle, and almost of a uniform thickness from the median line of the abdomen nearly to the back. It springs by digitations as far forwards as the fourth rib, and its fibres blend with the rectus over the cartilages of from the fifth to the tenth ribs. Posteriorly it is fixed to the anterior spine of the ilium; and its insertion is by muscular and tendinous fibres into the brim of the pelvis from the ilio-pectineal prominence to the symphysis. It is in close connexion with the insertion of the rectus, which it covers; but the main part of its inguinal fibrous insertion proceeds down the median line of the symphysis to about its middle, and rather nearer to the posterior than to the anterior end of the origin of the very broad gracilis (figs. 4 & 5, *E. o.*).

The two most peculiar points of interest in this muscle are, 1st, its attachment and close adherence to the rectus; and 2nd, its having the aponeurotic semilunar fascia stretching from the anterior spine of the ilium to the ilio-pectineal eminence and symphysis so strongly tendinous as to form well-developed Poupart's and Gimbernat's ligaments.

It is altogether a thin muscle in the Hare; and neither in it, the Guinea-pig, nor Rabbit, notably differs from that of the Agouti in its attachments.

\* P. Z. S. 1865, p. 335.

† *Loc. cit.* p. 107.

‡ Hunterian Lectures, Royal College of Surgeons, 1865.

The *internal oblique* and *transversalis* are so closely adherent as to seem but one. They have the usual attachments of the internal oblique, their only peculiarity being their relation with regard to the rectus muscle. In the Hare there is also a close relation between these two muscles, but in some parts the fibres are much more easily separated from each other.

*Rectus abdominis.* This muscle is nearly inseparable from the external oblique over the cartilages of the ribs, and is also conjoined to the serratus magnus at its anterior part. Its fibres, moreover, can be traced onwards as far as the first rib. It is distinct and well defined from the ensiform cartilage to about the umbilicus; but from this last point to the symphysis it is closely united with the internal oblique and transversalis, with fibres, however, which are clearly longitudinal.

At the pelvic attachment the muscles of the right and left sides cross each other precisely in the manner so well described by Prof. Owen\* as occurring in *Capromys fournieri*, and afterwards by C. L. Martin in *Myopotamus coypus*† and *Octodon cumingii*‡.

The belly of the *psaos parvus* is small in volume, but it has a long tendon of insertion. It arises by muscular fibres from the bodies of the antepenultimate and penultimate lumbar vertebræ; its narrow, strong tendon expands just as it is inserted into the brim of the pelvis.

It is nearly alike in the Hare and Guinea-pig.

The *psaos magnus*, on the contrary, is exceedingly large, and is more or less separated behind (below) into distinct fleshy fasciculi, especially where the anterior crural nerve pierces it. It arises from the vertebral surfaces of the bodies of the whole of the lumbar vertebræ, and is inserted as usual.

This muscle has the same apparent division in the Guinea-pig; but the fleshy fasciculi are not so distinct in the Hare.

The *iliacus* takes origin from the inferior surface of the blade of the ilium, and, joining the *psaos*, has its ordinary insertion (figs. 4 & 5, II.). It is very thick and fleshy. It possesses the same characters in the Guinea-pig; but in the Hare it is very intimately united with the *psaos magnus*.

*Quadratus lumborum.* This is a remarkably elongated muscle, extending beneath the bodies of the vertebræ as far forwards as the eighth dorsal one. It gradually broadens backwards until its fibres reach the transverse process of the last lumbar vertebræ, whence it narrows, and, running upon the ventral surface of the sacrum, is inserted by a single tendon into its outer margin, namely on the surface of the sacro-iliac synchondrosis, a strong tendon extending to the posterior end of that surface.

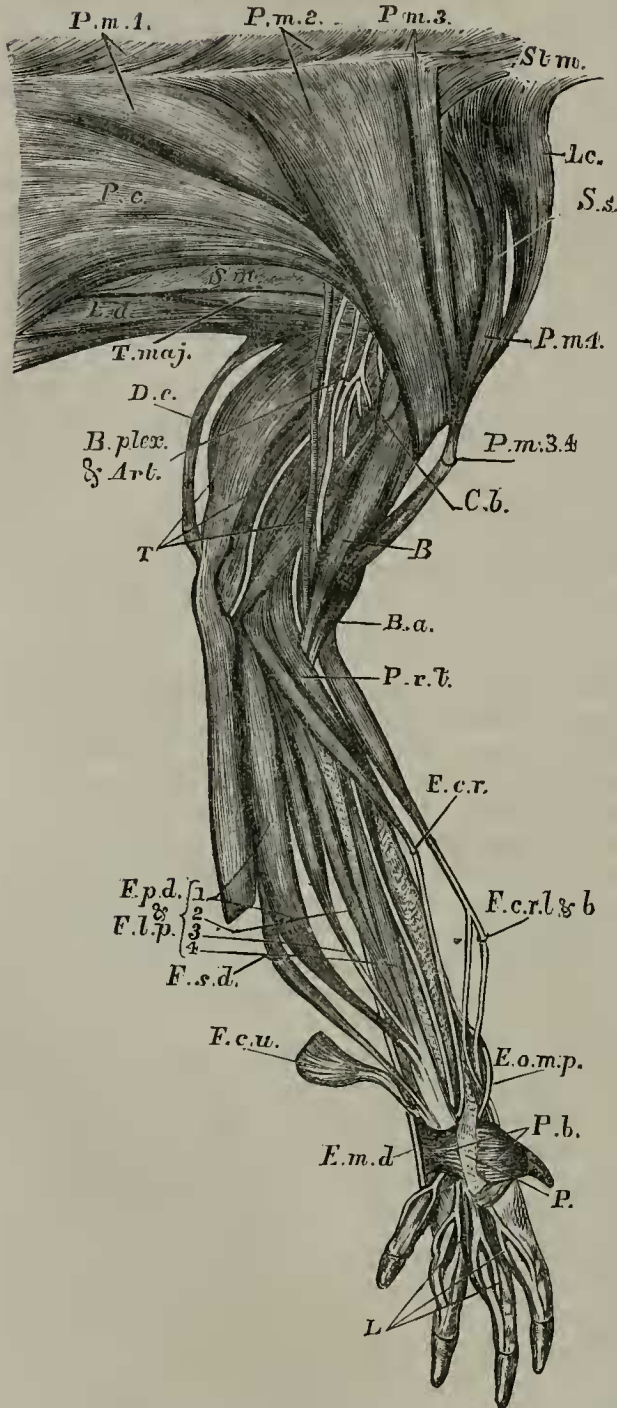
In the Hare, beautifully distinct tendons are sent to the ventral surfaces of each of the transverse processes of the lumbar vertebræ; they are present also in the Guinea-pig, but not so well defined, by reason of the colour of the flesh and diffused fat.

\* P. Z. S. 1832, p. 68.

† P. Z. S. 1835, p. 173.

‡ P. Z. S. 1836, p. 70.

Fig. 2.



*St. m.* Sterno-mastoid. *L. c.* Levator claviculae. *P. c.* Panniculus carnosus. *L. d.* Latissimus dorsi. *D. e.* Dorsi epitrochlear. *S. m.* Serratus magnus. *P. m. 1, 2, 3, 4.* Pectoralis major, the first, second, third, and fourth parts. *S. s.* Sterno-scapular. *B.* Biceps. *C. b.* Corneo-brachialis. *B. a.* Brachialis anticus. *T.* Triceps. *P. r. t.* Pronator radii teres. *F. c. r.* Flexor carpi radialis. *F. c. u.* Lower, cut portion of flexor carpi ulnaris. *P. b.* Palmaris brevis. *P.* Palmar ossicle. *F. s. d.* Flexor sublimis digitorum. *F. p. d.* and *F. l. p.* 1, 2, 3, 4. Separate heads of combined flexor profundus digitorum and flexor longus pollicis. *L.* Lumbricales. *E. o. m. p.* Tendon of extensor ossis metacarpi pollicis. *E. m. d.* Tendon of extensor minimi digiti. *B. plex. and Art.* Brachial plexus of nerves and brachial artery.

View of dissection of the left side of chest and inner aspect of fore limb in the Crested Agouti. (From a photograph by Dr. Murie.)

*Muscles of the Fore Limb.*

*Pectoralis major.* Perhaps the most striking difference between the posterior fibres of this muscle and that of the conjoined panniculus carnosus is the darker colour of the former. The pectoralis major is extensive, but on the whole of moderate thickness. Although peculiar, we did not find it to answer the description given by Prof. Owen of the same in *Capromys fournieri*\*; for it seemed to have four distinct origins, and as many insertions.

The first and largest portion consists of a very broad sheet of muscular fibre arising from the posterior two-thirds of the sternum, and, as already stated, is intimately blended with the panniculus carnosus (see fig. 2, *P. m.* 1); while it is also much adherent to the posterior portion of the sterno-scapular muscle. Its insertion extends from halfway down the deltoid ridge, upwards as far as the tendon of the coraco-brachialis; and a small slip of its fibres passes over this tendon to the surface of the fascia covering the subscapularis.

The second portion arises from the anterior fifth of the sternum, almost as far as the end of the manubrium. Its posterior border is closely connected with the anterior border of the first portion, so that these two together almost, if not quite, cover the sternal origin of the sterno-scapular. It is inserted into the shaft of the humerus, its whole length external to the insertion of the preceding portion (figs. 2 & 3, *P. m.* 2).

The third portion is a narrow band of muscle arising from the manubrium, and inserted into the lower end of the shaft of the humerus, immediately external to the second portion of this muscle (figs. 2 & 3, *P. m.* 3).

The fourth portion is a still narrower band, which arises from almost the outer end of the clavicle, and joining the third portion is inserted in common with it; and it is this junction and common insertion with an undoubted part of the pectoralis major which decides us to regard it as part of the pectoral, and not as a part of the deltoid (figs. 2 & 3, *P. m.* 4).

In the Hare, the Rabbit, and the Guinea-pig this muscle exists in a slightly modified condition from the above; and although the several portions spoken of are in them more adherent, nevertheless they are without much difficulty separable into nearly similar slips. What answers to the first and second portions in *D. cristata* may in them be regarded as but one sheet folded on itself at its sternal and humeral attachments. The insertion into the humerus of the third portion is neither so extensive nor so muscular in the three rodents in question.

In *Dasyprocta cristata* the *pectoralis minor* is wanting, or included in the *p. major*; the slip of the first portion of the latter muscle going to the subscapularis, possibly representing the insertion of the fused pectoralis minor.

Meckel†, in his description of a small muscle underneath the pectoralis major in the Marmot &c., says, "Il est possible, au reste,

\* P. Z. S. 1832, p. 74.

† *Loc. cit.* p. 251.



que ces muscles allant à l'humerus, ne représentent pas le petit pectoral mais seulement certaines parties du grand pectoral, dans ce cas, ma manière de voir serait encore plus exacte."

This muscle, however, seems distinct in the Rabbit, Hare, and Guinea-pig, where it is seen as an elongated band, with an origin adherent to and intermediate between the first portion and the sterno-scapular. Its insertion, however, is quite separate, namely into the ulnar tuberosity of the humerus, fibres also proceeding to the sub-scapularis.

*Sterno-scapular.* This muscle has a double origin. The larger portion arises from the sternum, between the origins of the first and second portions of the pectoralis major, and is closely invested by them as before stated. As it passes upwards it becomes slightly connected with the distal end of the clavicle, about an inch beyond which it unites with the second and smaller portion of muscle, being inserted together with it close to the anterior vertebral angle of the scapula. Some fibres pass over the supraspinatus, and are attached by fascia to the spine of the scapula.

The second and rather smaller portion arises from the outer side of the base of the manubrium and from the cartilage of the first rib. Passing forwards it joins the first portion as already mentioned (figs. 2 & 3, *S. s.*).

The sterno-scapular is an exceedingly long and narrow muscle. The second, smaller portion resembles by its origin, and indeed may be, the subclavius, as Meckel\* suggests; but it is the larger, and not the smaller part which is unmistakably connected with the outer end of the clavicle, the lesser part having only an aponeurotic attachment to that bone.

In the Hare there is but one, broad origin to this muscle, a small portion of its outer edge adhering firmly to the humeral extremity of the rudimentary clavicle as it passes beneath; while its insertion is very extensive, viz. from the vertebral angle of the scapula to the coracoid process, upon the surface of the supraspinatus. In the Rabbit and Guinea-pig there are two slips as in *D. cristata*.

The *deltoid* consists of two semidistinct portions—one arising from the inferior border of the metacromion process (tendinous superficially), the other investing the fascia of the infraspinatus immediately behind that process. These two portions have a common insertion into the lower half of the deltoid ridge, immediately external to the summit of insertion of the second part of the pectoralis major (fig. 3, *D.*).

This corresponds with our dissection of the same muscle in the Rabbit, Guinea-pig, and the Hare.

Meckel† considers the deltoid in the Agouti and Porcupine to consist of a clavicular as well as a scapular portion; but what he describes as the former is our fourth portion of the pectoralis major.

This may indeed be described as part of the deltoid; but, on account of its very different insertion from that of the ordinary clavicular part of the deltoid and its insertion in common with the third

\* *Loc. cit.* pp. 259, 260.

† *Loc. cit.* p. 255.

part of the pectoralis major, we are led, as before stated, to regard it as a portion of the last-named muscle.

The *supraspinatus* is larger in bulk than the *infraspinatus*. There is nothing unusual in its attachments.

The *infraspinatus* stretches from the infraspinous fossa to the summit of the outer border of the great tuberosity of the humerus.

The *subscapularis* is normal, but does not occupy the whole of the subscapular surface of the bone. Its condition approximates very much to that found in Hyrax\*.

The *teres major* arises from the upper half of the posterior margin of the scapula, and is inserted as usual, but in common with the *latissimus dorsi*.

The *teres minor* has an origin from the inferior third of the posterior margin of the scapula; and its insertion is into the base of the tuberosity of the humerus. It is altogether very small and closely adherent to the *infraspinatus*.

Meckel† seems to have failed in detecting this muscle in Rodents, possibly confounding it with the *infraspinatus*.

The last-mentioned five scapular muscles present no further difference worthy of mention, either in the Guinea-pig, the Rabbit, or the Hare.

The *biceps* has only a single head, and is inserted into the posterior border of the ulna by a strong tendon passing deeply between the muscles, and fixed to the ulnar side of the ridge immediately in front of the greater sigmoid cavity (fig. 2, B).

According to Meckel‡ this muscle also goes to the ulna in the Porcupine and Beaver; we have found this also to be the case in the Guinea-pig, Rabbit, and Hare; there is the usual attachment of the superficial fascia in the forearm; and in addition a strong fibrous band unites it to the neck and shaft of the radius.

The *coraco-brachialis* consists of two parts, the longer of which descends only to about the middle of the shaft of the humerus; the short part is inserted above the tendon of the *teres major*§ (fig. 2, C.b.).

In the Hare, Rabbit, and Guinea-pig this muscle does not descend so far down the shaft of the humerus as in *D. cristata*, and it is likewise less clearly, if at all, separable into two than in them.

Meckel|| considers it simple and short in the Hare, very long and strong in the Porcupine, and double in the Marmot.

The *brachialis anticus* (figs. 2 & 3, B. a.) is peculiar in being divided into two distinct parts, one of which arises at the back of the head of the humerus, much as in Hyrax¶, curving round the outside of the shaft. Its insertion is by a flattened tendon (much

\* P. Z. S. 1865, p. 338.

† Loc. cit. p. 78.

‡ Loc. cit. p. 288.

§ Since the above was read, Mr. John Wood has published a paper in the first number of the 'Journal of Anatomy and Physiology,' published at London and Cambridge, 1866. He therein proposes three names for the three portions of the *coraco-brachialis*. The two parts in the Agouti answer respectively to his *coraco-brachialis proprius* and *coraco-brachialis superior vel brevis* (loc. cit. pp. 48 & 49).

|| Loc. cit. p. 280.

¶ P. Z. S. 1865, p. 339.

thinner than that of the biceps) into the radial side of the shaft of the ulna, lower than the insertion of the biceps, but higher than that of the biceps in the Hare, Guinea-pig, and Rabbit.

The second portion, which also exists in the Hare and Rabbit, is much smaller in size, and has a separate origin and insertion. It arises from the front of the shaft of the humerus, immediately within the first part of the brachialis anticus, and below the deltoid ridge; it is a laterally compressed band of muscle, and has an insertion immediately adjacent to and to the inner side of the first part.

In the Rabbit the two portions of the brachialis anticus (which are more equal in size than in *D. cristata*) are separated from each other by the insertion of part of the pectoralis major, which runs far down the humerus, this part in *Dasyprocta* being inserted between the inner portion of the brachialis anticus and the biceps.

In the Guinea-pigs examined by us there was no second and separate portion to the brachialis anticus.

The *triceps* consists of three heads as in Man, and with the usual origin and insertions; the scapular head is large, and, moreover, has in addition a slight origin from the fascia investing the infraspinatus muscle (figs. 2 & 3, *T.*).

The other Rodents used for comparison do not vary from the above description.

The *supinator longus*, as Meckel observes, appears to be entirely absent, unless the inner parts of the brachialis anticus be considered a displaced supinator longus; but such can hardly be the case, on account of its very different insertion.

The Guinea-pig resembles the Agouti in this respect.

It is certainly wanting in the Hare.

The *supinator brevis* has an origin from the annular ligament of the radius, and is inserted as usual into the shaft of that bone (fig. 3, *S. b.*).

It is present and similar in the Guinea-pig.

In the Hamster, Agouti, Marmot, Beaver, and Rabbit, according to Meckel\*, it is inserted entirely, or almost so, into the upper half of the radius.

In the Hare and Rabbit we found it very small.

The *pronator radii teres* (figs. 2 & 3, *P. r. t.*) arises from the internal condyle, and has an insertion into the middle of the shaft of the radius as in the Hare, Rabbit, and Guinea-pig—not, however, extending to the lower end of this bone, as Meckel† asserts is the condition this muscle assumes in the Rodents.

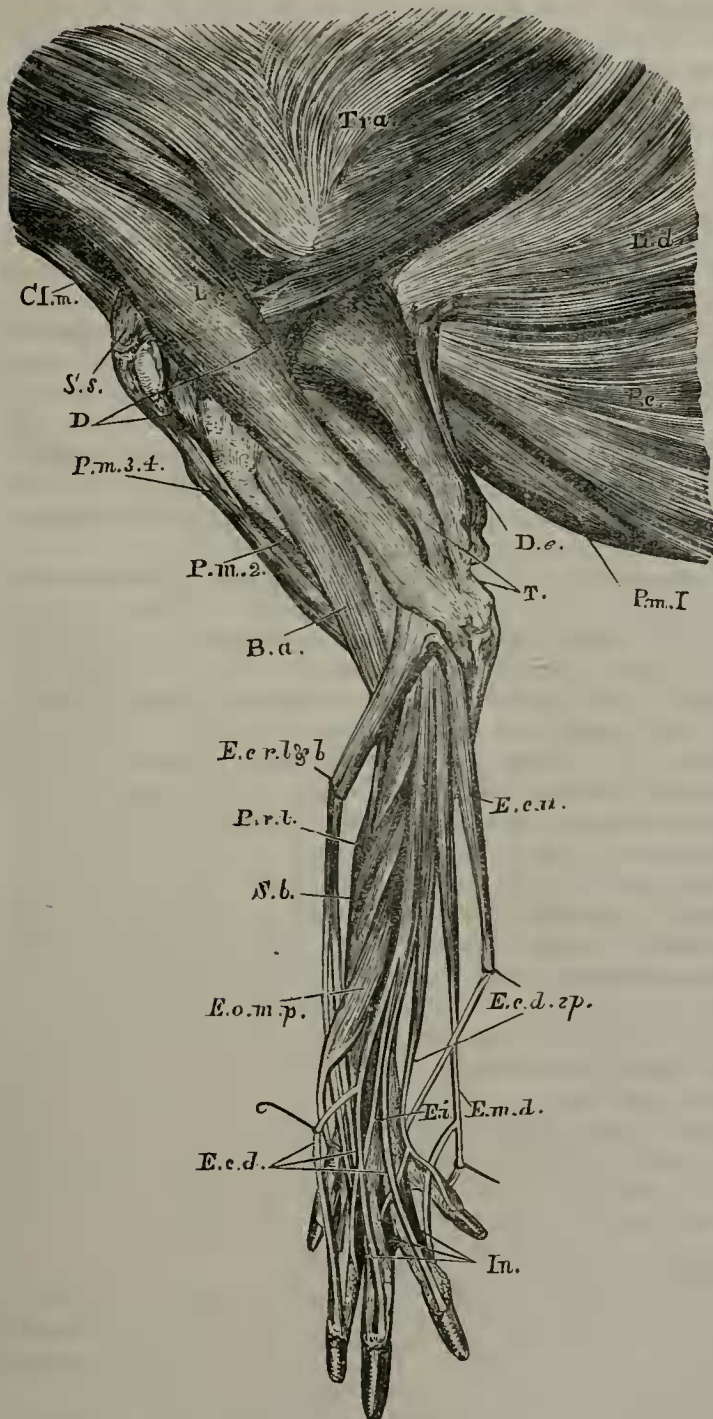
On the left fore limb of the Agouti we did, however, notice a thin fascia-like tendon, which seemed to spring from, or be a continuation of, the pronator teres, and to run on as far as the carpus.

The *flexor carpi radialis* has origin from the internal condyle, and an insertion by a long tendon which passes to the groove inside the styloid process of the radius, thence over the scaphoid, dipping deeply beneath the short flexor muscles of the pollex, and ending in the base of the first phalanx of the index (fig. 2, *F. c. r.*). It is similar in the three Rodents examined for comparison.

\* *Loc. cit.* p. 306.

† *Loc. cit.* p. 300.

Fig. 3.



*Tra.* Trapezius. *L. d.* Longissimus dorsi. *P. c.* Panniculus carnosus. *Cl. m.* Clavator clavicle. *S. s.* Sterno-supular. *D.* Deltoid. *P. m. 1, 2, 3, 4.* Pectoralis major, first, second, third, and fourth portions. *B. a.* Brachialis anticus. *E. c. r. l. and b.* Extensor carpi radialis longior and brevis. *P. r. t.* Pronator radii teres. *E. c. u.* Extensor carpi ulnaris. *S. b.* Supinator brevis. *E. o. m. p.* Extensor ossis metacarpi pollicis. *E. c. d.* Extensor communis digitorum. *E. c. d. 2 p.* Same muscle, second part. *E. i.* Extensor indicis. *E. m. d.* Extensor minimi digiti. *In.* Interossei.

Dorsal aspect, shoulder and left fore limb of Crested Agouti.  
(Photographed by Dr. Murie.)



The *flexor carpi ulnaris* is but moderately large; it arises from the ulnar aspect of the olecranon, and for a very short distance from the back of the shaft of the ulna. Its tendon, which is broad and flat, commences about halfway down the forearm, and has an insertion into the pisiform bone (fig. 2, *F. c. u.*).

In the Hare and Rabbit this muscle has likewise a slip of origin from the inner condyle in common with the flexor sublimis and profundus.

The Guinea-pig has this muscle relatively larger in the belly than the Agouti; its origin and insertion are similar.

*Palmaris brevis* (fig. 2, *P. b.*). This muscle, so diminutive in Man and the higher Quadrumana, is in *Dasyprocta cristata* very remarkable by reason of its great strength, and also from there being a very large palmar ossicle so developed as almost to divide it into two portions. The muscular fibres stretch across, taking origin from the first and the fifth digits for the whole length of the metacarpals.

The ossicle (fig. 2, *P. o.*) is nearly as long as the rather diminutive pollex, its proximal attachment being to the trapezium and base of the pollex; it looks, in fact, like an extra digit laid obliquely across the palm. The distal extremity reaches to the middle of the palm, but points towards the fifth digit; it terminates anteriorly in a somewhat sharp-pointed cartilaginous apex, its base alone being osseous.

In the Rabbit there is a double palmar cartilage, approaching in shape to the ossicle in the Agouti, not attached to the sides of the palm by muscular fibre as in Agouti, but only by a tendinous fascia.

In the Hare we find no ossicle or cartilage, but only a strong fascia.

In the Guinea-pig there is a palmar ossicle very nearly corresponding to that described in the Agouti, but the muscular fibres on either side are much paler and fewer in number.

Under the head of *flexor brevis manus* we may mention a small muscular mass superficial to the flexor tendons. The median nerve distributed to the palmar surface of the manus is closely embraced and surrounded by this muscle, which arises from the surface of the deep tendons on either side of the middle line, and has an apparent attachment or insertion into the proximal end of the fifth digit.

This muscle evidently agrees more or less with what we found in the Hyrax\*—with this difference, however, that in the latter it ended in three tendons.

What Prof. Huxley has described† as a separate belly of muscle proceeding from the tendons of the flexor sublimis in the Rabbit may be the representative of this muscle, with but a single tendon, going to the fifth digit.

In the Guinea-pig we failed to detect any such structure.

In the Hare this muscle is wanting.

All that we noticed as representing the *Palmaris longus* was a small slip adherent upon the voluminous flexor sublimis. This slip arises from the internal condyle, and seems to be continued into the palm of the hand by the superficial fascia.

There is a similar diminutive tendon in the Rabbit; but in the

\* P. Z. S. 1865, p. 341.

† Hunterian Lectures, 1865.

Guinea-pig dissected, an old fleshy male, there was a good-sized fleshy belly to the muscle above the tendon, which latter ended in the thick palmar fascia.

The *flexor sublimis digitorum* is quite a small muscle; it arises fleshy from the internal condyle along with the *flexor profundus digitorum*, lying rather to the ulnar side of this last. At the wrist it divides on the right limb into three rather delicate tendons, which form the perforated tendons of the second, third, and fourth digits; on the left limb it sends a division to the fifth digit (fig. 2, *F. s. d.*).

In the Hare we find it to have three tendons, going to the same digits as in the right limb of *Dasyprocta*; while in the Guinea-pig there are four, as in the left limb of *D. cristata*. The Rabbit, as Prof. Huxley has observed, is peculiar in having the *flexor sublimis* dividing into three tendons, with an extra muscle and fleshy belly to the ulnar side of these tendons, which itself sends a tendon to supply the fifth digit.

*Flexor profundus digitorum* and *flexor longus pollicis* (fig. 2, *F. p. d.* and *F. l. p.* 1, 2, 3, 4). These are represented by a complex muscle consisting of four parts: the first, and much the larger part, arises from the internal condyle; the second, outer part arises from the shaft of the ulna, its middle three-fourths; the third part, the smallest, arises in common with the first head, but rather deeper; the fourth part (which we take to represent the *flexor longus pollicis*?) arises from the middle three-fourths of the shaft of the radius.

The first, large portion is fleshy down close to the wrist, and so are the second and fourth portions; but the smallest portion becomes tendinous as far up as the middle of the forearm.

The whole of these tendons form an extraordinarily strong, hard, flat, single tendon, filling the entire interspace between the pisiform and scaphoid bones. In the palm of the hand this mass divides into four very broad tendons, inserted respectively into the second, third, fourth, and fifth digits; but no tendon goes to the pollex.

The component parts and distribution of the tendons of this muscle are the same in the Guinea-pig; but in the Hare and Rabbit there is an additional tendon to the thumb; in them also the fourth division, and not the third, is the smallest one.

*Lumbricales* (fig. 2, *L.*). These seem to be three in number. The *first* (radial) one arises from the radial side of the conjoined mass of tendon of the *flexor profundus* and *longus pollicis*, and also in part from the index tendon; it is inserted into the proximal end of the first phalanx of the second digit. The *second* (middle) one comes from the superficies of the same large conjoined tendon, and partly from the tendons of the index and third digits; it goes to the radial side of the third digit. The *third* (ulnar) one has a similar superficial origin from the conjoined tendon and those of the third and fourth digits; it is inserted into the ulnar side of the proximal phalanx of the third digit.

In the Rabbit, Hare, and Guinea-pig there are likewise three lumbrical muscles. Each of these is given off from, and attached to, the radial sides of the third, fourth, and fifth digits.

The *pronator quadratus* is very extensive, having attachments to the shaft of the radius and ulna for nearly their whole length, and not for half only as Meckel says\*. But at the same time he also states that it is found in some other Rodents in the same condition in which we find it in *Dasyprocta cristata*.

In the Guinea-pig, Hare, and Rabbit this muscle is very small, from the approximation of the bones.

The *extensor carpii radialis longior* arises from the humerus above the external condyle; its fleshy belly extends about halfway down the forearm, and ends in a tendon which is inserted into the proximal end of the metacarpal of the index (fig. 3, *E. c. r. l.* and *b.*).

There is no difference in the Guinea-pig, Hare, and Rabbit.

The *extensor carpii radialis brevior* arises beneath the last, and is inserted into the radial side of the metacarpal bone of the third digit (fig. 3, *E. c. r. l.* and *b.*).

The same in the Guinea-pig and Hare; the muscular bellies in all are very closely applied.

The *extensor communis digitorum* has origin from the external condyle, the muscle being strongly tendinous beneath. Passing downwards it divides into three separated tendons, which are respectively inserted into the second, third, and fourth digits. There is a second part, which gives rise on the ulnar side to a much more delicate tendon, which passes down beneath the tendon of the other part, and, dividing, goes to the third and fifth digits.

Meckel† remarks that in the Marmot there are two extra extensor muscles which supply the third and fourth digits.

In the Guinea-pig it is as in the Agouti, except that the tendons of the larger part are inserted into the third, fourth, and fifth digits; while the smaller part sends two tendons to the index and third digits respectively.

In the Hare this muscle sends four tendons—namely, to the index and the three outermost digits; that going to the fifth digit forms a muscular belly rather distinct from the rest, and which appears to represent the smaller part above described in the Agouti and Guinea-pig.

The *extensor carpii ulnaris* springs from the external condyle and the contiguous part of the ulna; its insertion is into the base of the fifth metacarpal bone (fig. 3, *E. c. u.*).

Alike in the Guinea-pig and the Hare.

*Extensor ossis metacarpii pollicis.* This is a very large and strong muscle, with an exceedingly broad tendon. It arises from the contiguous surfaces of the radius and ulna, and is inserted into the base of the metacarpal bone of the pollex (figs. 2 & 3, *E. o. m. p.*).

In the Guinea-pig it is similar, except that its tendon (the pollex being absent) runs on to the base of the metacarpal of the index, though mainly inserted into the rudimentary trapezium.

In the Hare, as in the Agouti, the tendon goes to the metacarpal bone of pollex.

Both the *extensor primi internodii* and *extensor secundi internodii pollicis* are absent in the Crested Agouti and in the Guinea-pig.

\* *Loc. cit.* p. 302.

† *Loc. cit.* p. 322.

The extensor primi internodii pollicis is also absent in the Hare and Rabbit; but the extensor secundi internodii, Prof. Huxley\* says, is, together with the extensor indicis, represented by one muscle. However this may be, in the Hare an extraordinarily small muscle arises from the ulna, and it sends an extremely delicate tendon to the second phalanx of the pollex; on one side it also sends a very delicate slip to the index.

The *extensor minimi digiti* comes from the external condyle and the upper half of the outer border of the ulna; its strong tendon divides into two, these going respectively to the fourth and fifth digits (figs. 2 & 3, *E. m. d.*).

It is the same in the Guinea-pig.

According to Prof. Huxley† this muscle in the Rabbit supplies three digits, and thus in a manner forms a double set of extensors. In the Rabbit dissected by ourselves there are only two tendons given off from the extensor minimi digiti, which go to the fourth and fifth digits, that to the fourth coming chiefly from the external condyle.

In the Hare this muscle appears to be almost entirely double: the superior belly, which goes up as high as the condyle, supplies the fourth digit; the deeper belly, which does not reach the condyle, supplies the tendon of the fifth digit. The two tendons cross.

The *extensor indicis* is a very small muscle, arising from the middle of the ulna, interosseous membrane, and opposite part of the radius; its tendon is inserted into the proximal phalanx of the index (fig. 3, *E. i.*).

In the Guinea-pig it arises from the ulna, outside the extensor ossis metacarpi pollicis, and is inserted into the same part as above.

In the Hare it is absent, unless, as Professor Huxley suggests, it is represented by the extensor secundi internodii pollicis.

### *Muscles of the Hind Limb.*

*Gluteus maximus.* We found a difficulty in assigning exact limits to this muscle, as what may be considered the tensor vaginæ femoris is for a considerable distance inseparably united with it, while posteriorly the gluteus maximus is in close relation with a portion of the biceps.

It arises by aponeurosis from the spines of the last lumbar and all the sacral vertebræ, and by muscular fibre from the anterior spine of the ilium and from the surface of the posterior border of the gluteus medius.

This extensive sheet is more or less divisible into two portions, the anterior of which probably represents the tensor vaginæ femoris, and it is inserted by aponeurosis immediately superficial to the outer end of what we take to be the sartorius. The posterior portion is inserted exclusively into the outside of the shaft of the femur, by strong tendinous fibres, especially into the prominence below the third trochanter‡ (figs. 4 & 5, *T. v. f.* and *G. max.*).

\* Hunterian Course of Lectures, College of Surgeons, 1865.

† Lectures above cited.

‡ As Meckel observes, vol. vi. p. 355.

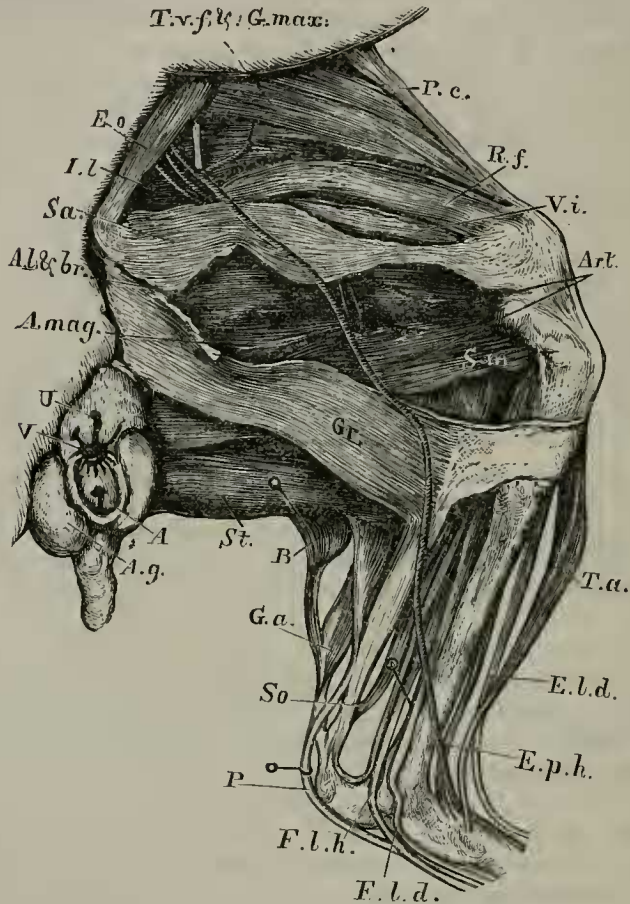


In the Guinea-pig the arrangement is similar, but the prominence on the femur is less marked.

In the Hare it is inserted into the third trochanter.

The *gluteus medius* is an enormous mass arising by muscular fibres from the anterior spine and crest of the ilium, and from its inferior (anterior) margin as far as the scansorius, also from the anterior

Fig. 4.



Left groin and hind leg to ankle of Crested Agouti.  
(From a photograph by Dr. Murie.)

*T. v. f.* and *G. max.* Tensor vaginae femoris and gluteus maximus. *P. c.* Insertion of panniculus carnosus. *E. o.* External oblique. *I. l.* Iliacus. *R. f.* Rectus femoris. *V. i.* Vastus internus. *Sa.* Sartorius. *A. mag.* Adductor magnus. *A. l. and br.* Adductor longus and brevis. *Sm.* Semimembranosus. *Gr.* Gracilis. *St.* Semitendinosus. *B.* Biceps. *Ga.* Gastrocnemius. *So.* Soleus. *P.* Plantaris. *F. l. h.* Flexor longus hallucis. *F. l. d.* Flexor longus digitorum. *T. a.* Tibialis anticus. *E. l. d.* Extensor longus digitorum. *E. p. h.* Extensor proprius hallucis. *Art.* Superficial and deep femoral arteries. *U.* Urethra. *V.* Vagina. *A.* Anus. *A. g.* Anal gland of right side.

sacral vertebræ. It is inserted by one large tendon into the summit of the peroneal trochanter, and by several smaller ones (slight fasciæ intervening) into the outer and posterior surface of the same trochanter (fig. 5, *G. med.*).

It is precisely similar in the Guinea-pig, even to the several pectinated-like tendons of insertion on the peroneal trochanter. In the Rabbit and Hare it is very thin, but the insertion presents more of a single flat tendon.

We found the *gluteus minimus* to be a very small muscle arising from the concave outer surface of the ilium, and having an insertion by a single strong tendon into the extremity of the peroneal trochanter (fig. 5, *G. min.*). This also answers to what is present in the Guinea-pig. The Hare and Rabbit, however, differ, as in them this muscle is largest, and in great measure covers the scansorius.

*Scansorius.* This muscle is present in *Dasyprocta cristata*, and is about the same size as the *gluteus minimus*, but is hidden by the *gluteus medius*. It arises by muscular fibres from the whole inferior (anterior) margin of the ilium, and is inserted by a very strong tendon, which passes down underneath the upper extremity of the *vastus externus* into the anterior margin of the greater (peroneal) trochanter (fig. 5, *Sc.*).

This muscle is relatively smaller in the Rabbit, Hare, and Guinea-pig.

The *pyriformis* has origin from the ventral surface of the sacrum, and, passing out superficial to the sciatic nerve, is inserted within the peroneal trochanter towards its summit. The anterior border of the muscle is intimately connected with the posterior border of the *gluteus minimus*.

In the Guinea-pig it is also connected with the scansorius.

The *obturator internus* is applied to the inner surface of the obturator foramen or fascia thereon, and, turning outwards, its strong tendon has an insertion into the trochanteric fossa immediately external to the quadratus femoris.

The *gemelli muscles* adhere closely to each other. One arises a little above the spine of the ischium; the other takes origin between that spine and the tuberosity of the ischium. They are inserted together into the trochanteric fossa, along with the obturator internus.

These muscles and the obturator internus Meckel\* mentions as existing ordinarily in Rodents.

*Quadratus femoris.* This is but a very small muscle, with an attachment between the tuberosity of the ischium and the acetabulum; its insertion is into the trochanteric fossa (fig. 5, *Q. f.*).

The *obturator externus* is large and fleshy, occupying the front of the pelvis as high as the upper margin of the obturator foramen; it proceeds into the trochanteric fossa.

The above five muscles present no important difference as to attachments in the other Rodents examined.

The *biceps*, strictly speaking, consists of two parts, although externally they are indistinguishable, and indeed they are for the most

\* *Op. cit.* vol. vi. p. 364.

part very intimately united (figs. 4 & 5, *B.*). The anterior portion arises from the sacral vertebræ, and is strongly muscular at its origin; superficially fibres pass on to the outside of the heads of the tibia and fibula, mingling with those of the broader second portion; but deeply this portion of the muscle terminates in a flat, thin and narrow tendon, which is inserted into the outer side of the patella.

The second portion originates by a very strong but short tendon from the outer side of the tuberosity of the ischium, and, expanding into a broad sheet of muscle, is inserted by aponeurosis into the outside of the leg down to the ankle.

It thus seems that the tensor vaginæ femoris, glutens maximus, and the two parts of the biceps form together an almost continuous investment or sheet of muscle from the crest of the ilium to the caudal vertebræ and ischium, and from the patella to the ankle: together most powerfully flexing the limb.

In the Guinea-pig the arrangement is very similar, except that the two parts are rather more distinct and that the anterior portion is narrower.

In the Hare the two parts are very distinct, and the tendon of the anterior portion to the patella is much stronger and longer. The posterior portion presents no essential difference in attachments; but the muscular sheet, which in the two former animals extends to the ankle, in the Hare is much more aponeurotic.

The *semimembranosus*, unlike the condition of this muscle in Hyrax\*, arises singly; but it agrees in being an uncommonly large muscle. It has origin from the whole of the triangular space (or tuberosity) of the ischium, and is inserted broadly from the inner condyle of the femur to the head of the tibia (fig. 4, *S. m.*). A slight dissection, moreover, shows a division at its insertion into three portions, as in Man. The middle one is more or less formed by a distinct round and strong tendon, which springs from a separate belly of muscle more or less surrounded and enclosed by the rest of the semimembranosus.

In the Guinea-pig, Hare, and Rabbit this separation, as it were, into two muscles is more strongly marked; in the two last the fleshy insertion of the largest portion into the tibia is not so extensive as in the Agouti and Guinea-pig. It is relatively very large in the latter.

*Semitendinosus.* Strong and bulky, it has two origins. The first arises by fleshy fibres from the caudal vertebræ as far back as opposite the tuberosity of the ischium, the fibres adhering to the deep fascia in the interspace between these two points.

A second head, much smaller than the preceding, but also muscular, comes from the tuberosity of the ischium, and immediately joins the larger head.

The anterior border of the first head is closely adherent to the posterior border of the glutens maximus. Insertion: by a broad translucent strong sheet of tendon the whole length of the shaft of the tibia to os calcis (figs. 4 & 5, *St.*), as mentioned on the opposite page in the description of the gracilis.

\* P. Z. S. 1865, p. 347.

This muscle is similarly arranged in the Hare and Rabbit, but has the fascia which goes to the tendo Achillis relatively weaker than in the Crested Agouti and the Guinea-pig.

*Sartorius* (fig. 4, *Sa.*). This muscle is very broad and fleshy. It is entirely different in its origin to that of Man, and seems to have for its office the rotation of the limb *inwards*. Its position (at the origin) somewhat resembles that of the pectineus muscle in the human subject. It arises from the ilio-pectineal eminence and the symphysis pubis, as far as its middle, a portion of the gracilis lying superficial to the posterior part of the origin of the sartorius. It is inserted by a tendinous fascia between the superior point of the elongated patella and the head of the tibia.

This tendinous fascia is in close relation at its insertion with the semimembranosus. A very long superficial femoral artery (fig. 4, *Art.*) crosses this muscle about its middle.

In the Guinea-pig this muscle has nearly the same position, relation, and attachments as in *D. cristata*. It differs considerably in the Rabbit and Hare. In the former of these two, besides having an origin from the ilio-pectineal eminence and slightly from the symphysis, it has another from the outer side of the anterior superior crest of the ilium, these different origins being connected by a strong fascia. In the Hare the main origin is from the anterior superior spine of the ilium, and but slightly from the ilio-pectineal eminence.

The *gracilis* is very powerful, from its extensive insertion, although it is but a moderately thick muscle. It arises (fleshy) from fully the posterior half of the symphysis, and is inserted by a fascia from the head of the tibia as far down as the ankle, the sheet of fascia joining that of the semitendinosus. The two together spread out between the internal malleolus and the tuberosity of the os calcis (fig. 4, *Gr.*).

This has a similar origin and insertion in the Rabbit, Hare, and Guinea-pig; but the fascia which proceeds down the leg is relatively weaker in the two first-mentioned.

The *pectineus* arises from the ilio-pectineal eminence and the adjoining brim of the pelvis, covered by the sartorius; its insertion is into the shaft of the femur, immediately beneath the insertion of the iliacus.

In the Hare and Rabbit it can hardly be said to be covered by the sartorius, and it is scarcely so in the Guinea-pig.

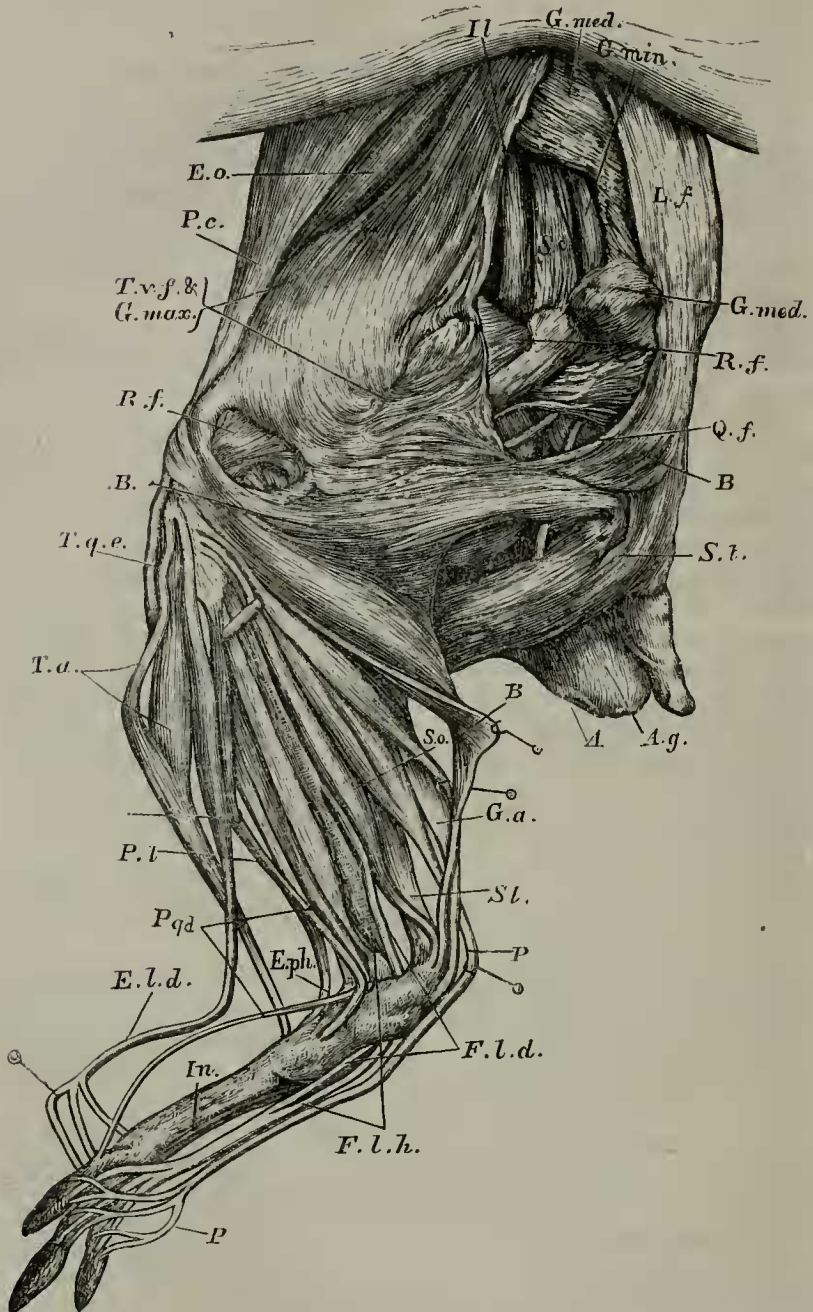
The *vastus externus* is very large, and with an origin from the upper half of the shaft of the femur as high as the rudimentary third trochanter; the insertion, which is by muscle, is on the outside of the patella, into the tendon common to the extensors of the thigh.

The *vastus internus* is small, and has a similar origin and insertion to the preceding, but on the inner side of the shaft of the femur. It arises as high as the tibial trochanter (fig. 4, *V. i.*). The vasti are similar in the Guinea-pig and Hare.

The *rectus femoris* is equal to the vasti muscles in thickness and bulk. It has the common origin by a double tendon, but a little muscular fibre extends beneath the lowest one; insertion as usual. In the Guinea-pig there is no marked difference.



Fig. 5.



Outer view of the left hind limb of the Crested Agouti, with the various muscles partially drawn aside to display the deeper layers. (Photographed from the dissection by Dr. Murie.)

*P.c.* Panniculus carnosus; its posterior fascia is partly removed to show portion of *E.o.*, the external oblique. *L.f.* Portion of lumbar fascia. *G.med.*

Gluteus medius. *G. min.* Gluteus minimus. *Il.* Iliacus. *Sc.* Scansorius. *R. f.* Rectus femoris. *T. v. f. & G. max.* Conjoined tensor vaginae femoris and gluteus maximus; the tendinous part continuous with the lumbar fascia is removed to exhibit the deeper muscles. *B.* Biceps. *Q. f.* Quadratus femoris. *S. l.* Semitendinosus; and lower down the same letters apply to its fascia continued towards the ankle. *T. q. e.* Tendon of combined quadriceps extensor going to patella. *T. a.* Tibialis anticus. *P. l.* Peroneus longus. *P. q. d.* Peroneus quarti digiti. *E. l. d.* Extensor longus digitorum. *E. p. h.* Extensor proprius hallucis. *In.* Interossei. *So.* Soleus. *Ga.* Gastrocnemius. *P.* Plantaris. *F. l. d.* Flexor longus digitorum. *F. l. h.* Flexor longus hallucis. *A.* Anal opening. *A. g.* Anal gland.

In the Hare and Rabbit the rectus is much less in size than the vastus externus, but about equal to the vastus internus.

The *crureus* covers the front of the femur as high as the surgical neck. This muscle is very large and most unusually distinct in all the four Rodents.

What we take to be the *adductor magnus*, by reason of its insertion, is a long and narrow muscle, in appearance not unlike an adductor longus as it exists in Man and some Quadrumana (fig. 4, *A. mag.*). It has origin by a narrow strongish tendon from the ischium towards the posterior extremity of the pubic symphysis, and has an insertion by tendon into the top of the lowest third of the shaft of the femur at its back.

The deep femoral artery passes over this muscle; so that no Hunter's canal exists, except what is formed by the fibres of the semi-membranosus.

The Guinea-pig agrees most nearly with the Agouti. In the Rabbit and Hare the adductor magnus is broader and more fleshy, it has also a larger insertion into the shaft of the femur.

*Adductor longus* and *brevis* (fig. 4, *A. l. & br.*). These, at their origin from the symphysis pubis and brim of pelvis, form but one mass, and so proceed to the femur. At their insertion into the back of the bone, extending from its head to about the middle of the shaft, there is a very slight interval, indicative of separation; this partial division is denoted by glistening tendinous fibres of the upper and larger portion of the muscle.

In the Hare and Rabbit these muscles are equally fused together; but, on the other hand, they are more separated in the Guinea-pig.

*Tibialis anticus.* Instead of its having, as is so often the case, a single origin and double insertion, this remarkable muscle has a double origin and a single insertion. The greater part arises by muscular fibres from the outer side of the upper fifth of the tibia and the head of the fibula. The smaller division arises by a very long and strong tendon from the front of the femur, on the outer condyle, just outside the rotular surface.

The two portions become intimately united a little below the middle of the tibia, and are inserted by a quite single but exceedingly strong tendon into the proximal end of the metacarpal bone of the index of the foot, *i. e.* the inner toe (figs. 4 & 5, *T. a.*).

It has the same peculiarities in the Guinea-pig\*; but in the Hare

\* In one specimen of the Guinea-pig this muscle had but a single head.

and Rabbit (according to our dissections) this muscle has but a single head of origin, which arises from the upper portion of the tibia, thus differing widely from the condition present in the Agouti and Guinea-pig.

Meckel\* says that in the Porcupine it is united with the extensor proprius hallucis; but in our specimen that muscle existed in addition to the double tibialis anticus. He further observes† that in the Marmot the tibialis anticus is divided into a large tibial and a small peroneal head; but there is no mention of any origin from the femur.

The *extensor longus digitorum* arises by a very broad tendon from the femur, just external to the long tendon above-mentioned of the tibialis anticus. Proceeding downwards, it divides into three tendons, which are respectively inserted into the second phalanges of the only digits present, *i. e.* second, third, and fourth (figs. 4 & 5, *E. l. d.*).

The Guinea-pig appears to have a similar disposition in this muscle, although in one foot we noticed the inner tendon bifurcating, the double tendon going to the same digit. In the Hare and the Rabbit it arises by a long, *round* (instead of flattened), strong tendon from the front of the outer condyle of the femur; this tendon then runs through that groove which the femoral tendon of the tibialis anticus traverses in the Agouti. It divides into four tendons, which are inserted into the four digits; that to the index or inner toe sends a branch to the third digit.

The *extensor proprius hallucis* is rather a delicate muscle (fig. 5, *E. p. h.*). It arises from the upper two-thirds of the fibula and interosseous membrane, gives origin to a slender tendon, which ends in an insertion into the second phalanx of the index. The same in Guinea-pig.

This muscle is absent in the Hare and Rabbit.

The muscular fibres of the *extensor brevis digitorum* extend forwards over about the posterior third of the metatarsal bones, arising also from the dorsum of the tarsus above the cuboid and os calcis. These give rise to two tendons, which are inserted respectively into the two inner toes, namely the index and third digits, joining at the side the tendons of the long extensors.

It is the same in the Guinea-pig; but this muscle is wanting in the Hare and Rabbit.

*Peroneus longus.* This is a small muscle arising, as in *Hyrax*‡, from the head of the fibula, on each side of the lateral ligament; so that at first sight it appears as if it arose by a tendon from the femur, like the extensor longus digitorum. Passing down behind the external malleolus it sinks beneath the foot, passing through the groove on the outer side of the cuboid, crosses the sole deeply (hidden by

\* *Loc. cit.* p. 410.

† *Ibid.* p. 411.

‡ See P. Z. S. 1865, p. 348, and fig. 12. p. 349, where, by an error of the artist (pardonable by reason of the very deceptive appearance of the external lateral ligament), the peroneus longus has been figured as if arising by tendon from the femur, which, as may be seen in the description, it does not; while the extensor longus digitorum, which really does arise from the femur, is represented as coming only from the tibia.



the distal end of the elongated plantar surface of the naviculare), and is inserted into the proximal end of the metatarsal of the index (fig. 5, *P. l.*).

In the Guinea-pig, Hare, and Rabbit it is similar; but in one specimen of the Guinea-pig the tendon passed altogether in front of the malleolus.

The *peroneus quarti digiti* (fig. 5, *P. q. d.*) is a much longer and rather larger muscle than the preceding; it arises by muscular fibre from the outer side of the fibula, its whole length almost to the malleolus. Its tendon goes beneath that of the peroneus longus, and is inserted into the proximal phalanx of the outermost, *i. e.* fourth digit.

In the Guinea-pig, except that the origin is not quite so extensive, it is similar; but in the Hare and Rabbit its fleshy origin is much shorter, it still arises, however, from the whole length of the much shorter fibula. It is inserted also into the proximal phalanx of the fourth digit.

In the Crested Agouti and Guinea-pig there is no peroneus quinti digiti present. In this respect they differ from the Common Rabbit, where, according to Prof. Huxley\* (whose observation we have verified), there are four peronei muscles, which he suggests may be, along with the tibialis secundi, remnants of another set of extensors.

In the Hare, where there are also four peronei muscles, the peroneus quinti digiti arises from the head of the fibula above the origin of the peroneus quarti digiti. Passing behind the malleolus and beneath the tendon of the peroneus longus, it is inserted into the proximal phalanx of the fifth digit.

The *peroneus brevis* is absent in *Dasyprocta cristata*. In the Hare and Guinea-pig it is present, and arises from the upper end of the anterior surfaces of both the tibia and the fibula, being inserted into the outer side of the proximal end of the outermost metatarsal (that is to say, the fifth) in the Hare; but in the Guinea-pig with a sesamoid bone beneath the proximal end of the outermost (*i. e.* fourth) metatarsal.

The *peroneus tertius* is absent in all the four animals compared; but in one specimen of the Guinea-pig the peroneus longus seemed, as has been said, to assume to a certain extent the appearance of a peroneus tertius, inasmuch as it *passed in front* of the malleolus.

The *gastrocnemius* is very large, and has much the appearance of the same muscle in man. It arises as usual and partly from two sesamoid bones, that head which springs from the internal condyle being slightly the larger of the two; insertion the tuberosity of the os calcis (figs. 4 & 5, *Ga.*).

The Guinea-pig has also sesamoid bones to this muscle; differing in this respect from the Hare, in which we have found them absent. In the latter animal the tendon of insertion in the os calcis is distinct from that of the soleus.

*Plantaris.* This arises by a strong tendon from the sesamoid bone of the external condyle, and passing downwards beneath the

\* Hunterian Lectures for 1864-65.



gastrocnemius, its tendon becomes superficial to that muscle; wrapping round it, and proceeding beneath the tuberosity of the os calcis, it becomes continuous with the plantar fascia, and forms the perforated tendons of the three digits (figs. 4 & 5, *P.*). In the Rabbit and Hare it terminates in four tendons; but the Guinea-pig has three, as in the Agouti.

Prof. Huxley, in his Hunterian Lecture, 20th March, 1865, said, "The extensor muscles of the leg in the Rabbit are inversely developed; for the flexor brevis is represented by a muscle which arises in the leg—namely the plantaris, which springs, as usual, from the outer condyle, wrapped up in the heads of the gastrocnemius and soleus, and it is relatively immense. It ends in a tendon which spreads on the pulley-like end of the calcaneum, and divides into four perforated tendons, thus replacing the flexor brevis, as in *Dasyptes sexcinctus*."

The *soleus* has origin from the external side of the head of the tibia. Its tendon has an insertion in common with the tendo Achillis into the os calcis (figs. 4 & 5, *So.*).

Alike in the Guinea-pig; but in the Hare the tendon of insertion continues perfectly separate from that of the gastrocnemius to the very os calcis itself.

The *popliteus* comes by a strong tendon from the external condyle of the femur. It is inserted as usual, but lower down, occupying as much as two-fifths of the tibia, which it also does in the Guinea-pig, the Hare, and the Rabbit.

The *flexor longus digitorum* is, comparatively speaking, a small muscle, certainly much less in volume than the flexor longus hallucis is in *Hyrax*\*. It arises by a few delicate fibres from the head of the fibula, but mainly from the back of the tibia, except the part covered by the popliteus. It becomes tendinous superficially above the middle of the leg, and the tendon, as it becomes round in form at the ankle, glides through a groove behind the internal malleolus and joins in the sole of the foot the broader tendon of the flexor longus hallucis; but the tendon of the flexor longus digitorum is seen of itself to form the principal part of the tendon going to the index (figs. 4 & 5, *F. l. d.*). In the Guinea-pig the conditions are the same. In the Hare this muscle is intimately connected with the flexor longus hallucis, both in the fleshy bellies and in the tendons; but it appears to supply mainly the perforating tendons of the index, middle, and fifth digits.

The *flexor longus hallucis*, as in *Hyrax*†, is much larger than the flexor longus digitorum. It has origin from the upper two-thirds of the fibula and the interosseous membrane. Below, it forms a very large tendon, which, passing in a deep groove at the back of the tibia, unites with the preceding muscle, and terminates as the perforating tendons, forming, however, almost exclusively those of the third and fourth digits (figs. 4 & 5, *F. l. h.*).

The same in the Guinea-pig. In the Hare it is, as before said, closely united with the flexor longus digitorum, both in its belly and

\* P. Z. S. 1865, p. 350.

† Ibid.

tendon; but the latter forms mainly the perforating tendons of the third and fourth digits, sending small slips, however, to the larger tendons of the flexor longus digitorum going to the index and fifth digits.

*Tibialis posticus.* This muscle in the Guinea-pig is of fair size, and is inserted into the proximal end of the metatarsal of the index: but in the Agouti it is wonderfully small, consisting of a minute fleshy belly which arises from the back of the tibia, at its upper part; its extremely delicate tendon passes down behind the internal malleolus, and is inserted into the proximal end of the plantar surface of the naviculare.

Prof. Huxley, in his Hunterian Course of Lectures for 1865, said that there is no proper *tibialis posticus* in the Rabbit; but a muscle arises from the inner and front face of the tibia, and passes through a groove at the inner malleolus, then runs beside the second metatarsal and joins the extensor tendon. For this muscle he proposed the name of *tibialis secundi*.

Our dissection of the Rabbit corroborates his observation, and we have also found a similar arrangement in the Hare. In this last the muscle comes from the inner surface of the tibia, and has fleshy fibres for a third of the length of the shaft of the bone; its tendon, which is flat and closely appressed to the periosteum, is with difficulty distinguishable from that until it reaches the malleolus. Its insertion on one foot was into the distal end of the first metatarsal of the index or innermost digit; but in the other foot the tendon bifurcated opposite the distal end of the inner metatarsal bone, the extra smaller-sized tendon passing to the third metatarsal bone at its distal end.

The *lumbricales* of the hind foot are at most but two in number. One arises between the tendons going to the third and fourth digits, and is inserted into the peroneal side of the third digit. Another muscle arises from the tibial side of the tendon of the third digit; but, as it is inserted into the deep surface of the tendon of the plantar portion of the plantaris muscle, this may very probably represent the *accessorius* which we found so well marked in the foot of *Hyrax*\*. In the Guinea-pig the above muscles are two in number. In the Hare there are three *lumbricales*—one arising from the tendon going to the third digit, the second from the tendon common to the fourth and fifth digits; the third comes from the tendons of the fourth and fifth digits, where these bifurcate.

The *interosseous* muscles occupy only the plantar surface of the hind foot; they are so very large in size as to cover deeply the entire surface of the sole (fig. 5, *In.*); they are true flexors of the three digits. There are also three pairs in the Guinea-pig; these lie so closely appressed as to appear but three single muscles. In the Rabbit, as well as in the Hare, there are four pairs of *interossei* muscles in each foot, corresponding to the number of the metatarsal bones. They arise in common by a very strong fascia from the tarsus, and are inserted respectively into the sesamoid bones on the

\* *Loc. cit.* p. 351. fig. 13, *A.*

plantar surface of the joints, between the metatarsal bones and the digits.

#### SUMMARY OF FACTS.

Before concluding our observations on the Crested Agouti, we must express our regret that circumstances occurred which caused us to forego a description of the brain, part of the nervous and the vascular systems, and the muscles of the back and neck.

Of the facts here recorded we may recall, as more or less noteworthy, the unconstricted condition of the stomach of *D. cristata*, the much greater length of its large intestine as compared with that of *D. aguti*, the tendency towards a double apex of the heart, the approximation of the ureters to the fundus of the bladder, and the presence of a superficial long femoral artery.

As regards the comparison instituted between the Crested Agouti, the Guinea-pig, Hare, and Rabbit, we find that the first differs from all the others, and stands alone, in the following particulars:—1, the number and arrangement of the pads of the pes and manus; 2, the great extension of the levator claviculæ; 3, the absence of the rhomboideus capitis; 4, the more extensive insertion into the humerus of the third part of the pectoralis major; 5, the absence of the pectoralis minor; 6, the more distinct separation of the coraco-brachialis into two, and its extension further down the shaft of the humerus; 7, the insertion of the brachialis anticus below the biceps; 8, the presence of a flexor brevis manus; 9, the less marked division of the semimembranosus; 10, the absence of the peroneus brevis.

On the other hand, the Agouti agrees with the Guinea-pig, and differs from the Hare and Rabbit (as far as our observations go) in the subjoined conditions:—1, the presence of the pads beneath the pes and manus; 2, the two fleshy bellies to the digastric; 3, the peculiar scalenus anticus; 4, the single posterior scalenus; 5, the more distinct division of the psoas magnus; 6, the less intimate union of the psoas and iliacus; 7, the large size of the supinator brevis; 8, the remarkable palmar ossicle; 9, the fact that no tendon of the deep flexor goes to the pollex; 10, the great size of the gluteus medius; 11, the gluteus minimus being smaller than the gluteus medius; 12, the less strong and distinct tendon of insertion of the biceps femoris; 13, the larger rectus femoris; 14, the smaller and less fleshy adductor magnus; 15, the double head of the tibialis anticus; 16, the presence of an extensor hallucis; 17, the absence of a tibialis secundi; 18, the presence of an extensor brevis digitorum pedis; 19, the absence of a peroneus quinti digiti; 20, the presence of sesamoids at the origin of the gastrocnemius; 21, the union of the tendon of the last with the solens; 22, the separate conditions of the bellies of the flexor longus digitorum and flexor longus hallucis; 23, the presence of a tibialis posticus.

How far these myological distinctions may extend, whether any are due to mere individual variation, or whether some may serve to characterize the respective genera or even families, more extended observations can alone determine. It is difficult, however, not to

incline to the belief that some of these differences may be coextensive with the families *Hystriidae* and *Leporidae* respectively; but even should they prove to be only distinctive marks of subordinate groups, these observations will not be destitute of some slight zoological and classificatory value, in addition to whatsoever they may express of anatomical interest.

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November 22, 1866.

Dr. J. E. Gray, F.R.S., V.P., in the Chair.

The Secretary read a letter from Mr. A. Grote of Calcutta, F.Z.S., stating that the Porcupine transmitted to the Society on April 18th, 1866, and subsequently described by Dr. Gray (P. Z. S. 1866, p. 306, Pl. XXXI.) as *Acanthochoerus grotei*, had been received from Malacca. It had been procured for him by Capt. Maddison, Commander of one of the Straits Mail Steamers, from the jungles behind Malacca. Mr. Grote promised to endeavour to obtain other examples of this animal for the Society.

Mr. Selater exhibited a young specimen of *Chauna derbiana*\* in spirits, which had been forwarded to him by Dr. W. Huggins of San Fernando, Trinidad, C.M.Z.S., with the following note:—

“This is a species of Wader, apparently a young bird; the people here call it ‘*Wild Turkey*.’ These birds are very rare here, being found now and then in a large lagoon. I saw one some forty years ago, a large one, and have never met with one since until now, though I have shot in a great many places over the island. Three young birds of this species were brought to a friend of mine some little time ago, one of which I now send you.”

Mr. Selater remarked that the only species of the group of *Palamedeidae* given as occurring in Trinidad in M. Léotaud’s recently published work on the ornithology of that island† was *Palamedea cornuta* (p. 488), and that he strongly suspected that the so-called *Palamedea cornuta* of Trinidad would turn out to be the present species, which was now ascertained to extend its range from the littoral of New Granada and Venezuela into that island.

The following extract from a letter addressed to the Secretary by Dr. G. Bennett, F.Z.S., and dated Sydney, July 20th, 1866, was read:—

“Respecting the Whistling Ducks in the Botanic Gardens here, I observe in the ‘*Proceedings*’ for March last, just received (p. 149),

\* See P. Z. S. 1866, p. 369.

† Oiseaux de l’île de Trinidad, par A. Léotaud. Port d’Espagne, 1866.